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SPECIAL ARTICLE.

ON ADRENALIN GLYCOSURIA AND ALLIED FORMS OF GLYCOSURIA DUE TO THE ACTION OF REDUCING SUBSTANCES AND OTHER POISONS ON THE CELLS OF THE PANCREAS.[1]

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THIS publication is made for the purpose of giving a condensed account of a recent experimental research on glycosuria due to the action of reducing substances and other poisons on the cells of the pancreas. In collaboration with Dr. A. J. Wakeman a detailed account of this work will before long be presented in the *Journal of Experimental Medicine*.

The starting point in this study of glycosuria is the observation that adrenalin chloride when introduced into the peritoneal cavity of dogs is almost regularly followed by the appearance of considerable quantities of sugar in the urine.[2]

Preparation and Chemical Characters of Adrenalin Chloride.—Of the method of preparing adrenalin chloride little need be said here as this subject has recently been discussed by Takamine.[3] One point should, however, be noted. In the course of preparing adrenalin the finely disintegrated suprarenal glands are steeped in water for about five hours at a temperature varying from 50 to 80 degrees C. and later are exposed to 90-95 degrees C. for one hour. This temperature is sufficiently high to destroy most, if not all, diastatic ferments. The adrenalin chloride, in concentration of 1-1000, of commerce shows a slightly alkaline reaction on moist litmus paper and with phenolphthalein. The colorless aqueous solution absorbs oxygen from the air and changes to pink and later to red or brown. The energetic reducing action of the solution is shown by its behavior to many salts. One cubic centimeter of 1-1000 aqueous solution of adrenalin chloride reduced .042 c.c. of Fehling's solution and 100 c.c. of the solution were thus equivalent to 0.21 gm. glucose. Adrenalin chloride reduces potassium permanganate in the cold and Dr. Wakeman has calculated that the weight of oxygen which is taken up from this salt during the reduction of 1 c.c. of the commercial solution of adrenalin is 0.000313 gm.[4]

The commercial aqueous solution of adrenalin 1-1000 was employed in the research to be described. A few observations were made with adrenalin prepared by a somewhat different method by Dr. John J. Abel, who kindly placed some of his product at our disposal. One portion of the adrenalin given us by Dr. Abel is free from loose ammonia and differs in some of its reactions from the adrenalin of commerce, but its physiological effects are essentially the same.

There are many conditions which affect the degree and duration of adrenalin glycosuria and some of these must be mentioned.

Mode of Administration.—Subcutaneous injections of adrenalin chloride yield only slight degrees of glycosuria. Thus in a typical instance, a dog of 15 kilos received 10 c.c. adrenalin under the skin. Before the injection, the urine contained 0.48 per cent. reducing substance (Pavy's method). The first collection after injection contained 0.66 per cent. reducing substance, the second 0.52 per cent. reducing substance. The explanation of the small excretion of sugar is that the adrenalin is largely oxidized before entering the circulation. Larger percentages of sugar may be obtained but they involve the use of larger doses.

Intravenous injections of adrenalin are followed by a larger excretion of sugar where a dose of from 5-10 c.c. of adrenalin is put into a dog of from 8-15 kilos. Five or six per cent. of glucose may be observed under these conditions, but the percentage is sometimes much smaller. A rise in the blood pressure is an accompaniment of the glycosuria, but the latter outlasts this rise.

Other conditions being similar, a given dose of adrenalin (from 2-15 c.c.) gives rise to a greater excretion of sugar when administered by the peritoneal cavity than when given intravenously. In well-fed dogs of medium size, a dose of from 4-6 c.c. is always, or nearly always, followed by some degree of glycosuria. Somewhat larger doses almost regularly occasion the appearance of from 3-6 per cent. of sugar within an hour of the completion of the injection. The percentage of sugar may rise to 10 per cent. or more. Sugar has in some cases been detected within fifteen minutes of the completion of the injection. The systemic blood pressure has been observed to rise after intraperitoneal injections, but not to the height noted after intravenous infusions. Thus, in a dog of 11 kilos, there was a rise from 100 m.m. to 110 m.m. of mercury after an injection of 10 c.c. of adrenalin. Some rise was maintained for about an hour. Then there was a fall to below 100 m.m. Under similar conditions an intravenous dose of 10 c.c. of adrenalin might be expected to cause a rise from 100 m.m. to 130-160 m.m. of mercury.

By mouth adrenalin apparently has no effect in ordinary doses. A well-fed dog of 13 kilos received 10 c.c. of adrenalin by mouth without resulting glycosuria—an experience which corresponds with the known absence of physiological effect of gland extracts upon the human subject.

Effect of Dilution.—In the case of intraperitoneal injections of adrenalin, the excretion of sugar appears to be comparatively small when a considerable degree of dilution is practised. Thus in a well-fed dog of 8 kilos, 10 c.c. of adrenalin with 40 c.c. of 0.85 per cent. salt solution, gave rise to the appearance of 0.16 per cent. of sugar in 1000 c.c. of urine—a smaller total than is usual following such a dose. Sometimes, indeed, glycosuria does not appear, as for instance in the case of a well-fed dog of 6 kilos, which received 4 c.c. of adrenalin with 12 c.c. of 0.85 per cent. salt solution. Four hours and nineteen minutes later, 30 c.c. of urine contained no sugar.

Size of the Dose.—Within certain limits the quantity of sugar excreted appears proportional to the dose of adrenalin, but the relationship has not yet been carefully studied. It is certain that doses smaller than those

[1] Abstract of paper delivered at the annual meeting of American Physicians held in Washington, April 29, 30, 1902.

[2] Herter & Richards. Note on the Glycosuria Following Experimental Injections of Adrenalin. MEDICAL NEWS, Feb. 1, 1902.

[3] The Blood-Pressure Raising Principle of the Suprarenal Gland. Journal of the American Medical Association, Jan. 18, 1902.

[4] Using a standard solution of $KMnO_4$ in which 1000 c.c. of the solution = 0.3467 gm. $KMnO_4$.

usually employed may suffice to induce glycosuria. Thus in a dog of 5.5 kilos, an injection of 2 c.c. adrenalin with 2 c.c. 0.85 per cent. sodium chloride solution was followed by the appearance of 3.75 per cent. of sugar in the urine. There is reason to think that when a certain dose is followed by a very large excretion of sugar a larger dose would not have materially increased this output.

Duration of the Glycosuria.—The glycosuria after a moderate intraperitoneal dose of adrenalin (say 5-8 c.c. in a dog of 10 kilos) lasts usually somewhat less than twenty-four hours. As a rule the glycosuria is at its height within a few hours after the administration of the adrenalin. The excretion of sugar then declines rapidly and the urine soon contains only a fraction of one per cent. of reducing substance.

Total Quantity of Sugar Excreted.—The total amount of sugar excreted under the conditions just mentioned is usually not more than a few grams. The very high percentage sometimes observed soon after the injection of adrenalin might lead one to expect a much larger total excretion than actually occurs. The explanation of this unexpectedly small output of sugar lies in the rapid decline of the glycosuria after the first few hours.

Nature of the Sugar Excreted.—No careful study has yet been made of the chemical constitution of the sugar excreted after adrenalin, but there is reason to think that glucose is the chief, if not the sole, constituent of the urine, in at least most instances of adrenalin glycosuria. In those cases in which the results of titration with Fehling's solution have been compared with the results obtained by fermentation there has been a close agreement. A glucosazon is obtainable without difficulty. The urines examined have shown dextrorotation. The chemical nature of the carbohydrates deserves much more careful study as it is by no means proven that dextrose is the only sugar present in the urine after adrenalin.

Sugar Content of the Blood.—Numerous observations on the sugar content of the blood before and after the production of adrenalin glycosuria indicate that in well-fed animals there is regularly an increase in the blood sugar. The following observation which was made by Dr. A. N. Richards is in several respects instructive.

A well-nourished dog (7.6 kilos) was fed 12 hours previous to the intraperitoneal injection of 8 c.c. of adrenalin.

Blood.	Amount.	Sugar.	Coagulation Time.
Normal	29 gm.,	0.26 per cent.,	4 m., 00 sec.
5 minutes after injection	15 gm.,	0.36 per cent.,	2 m., 15 sec.
10 minutes after injection	11.5 gm.,	0.40 per cent.,	2 m., 00 sec.
32 minutes after injection	10.7 gm.,	0.44 per cent.,	2 m., 20 sec.
1 hour after injection	11.8 gm.,	0.43 per cent.,	4 m., 10 sec.
5 hours after injection	10.8 gm.,	0.31 per cent.,	3 m., 05 sec.
17 hours after injection	27.3 gm.,	0.10 per cent.,	3 m., 00 sec.

These results, which are typical, speak for themselves and call for little comment. The rapid increase in the blood sugar after injection is striking. Another point of interest is the subnormal content of sugar after the lapse of 17 hours. The increased rapidity of coagulation noted here has been observed in other instances, but appears to be unconnected with the occurrence of glycosuria. Dr. Richards has made a careful, detailed study of the behavior of the blood sugar after adrenalin and his results will soon be published.

Influence of the State of Nutrition.—In general it may be said that the largest quantities of sugar have been observed in well-nourished dogs that had been recently fed. An adrenalin glycosuria may be obtained, however, even in dogs that have to be starved for two or three days. The glycogen content of the liver is undoubtedly a factor of much importance in determining the degree of the glysosuria. Sufficiently careful observations have not yet been made with reference to the influence of this factor, but there is some evidence that after a period of starvation, combined with the administration of phlorhizin, the excretion of sugar induced by adrenalin is very small. Thus in a dog of 20 kilos, after a period of fasting and of dosing with phlorhizin, 10 c.c. of adrenalin intraperitoneally failed to cause glycosuria during the first 4 hours following the injection. During the next 20 hours the urine contained 0.1 per cent. of reducing substance.

On the Apparent Tolerance which Follows Repeated Intraperitoneal Injections of Adrenalin.—Observations were made in regard to the effects of repeated injections of adrenalin in four dogs, of which only three were normal, the fourth having had the spleen and one half the pancreas removed at previous operations.

Injections were usually made every third day with doses gradually increasing. After about one month, two of the dogs died in consequence of excessive doses of adrenalin. The remaining animals, including the splenectomized dog, received injections during about two months. It was observed that the usual symptoms of an injection of average size became less pronounced than at the beginning of the experiment and that the sugar excretion was very much less. In the case of the splenectomized dog sugar ceased to appear in the urine after the last three injections, although the doses were larger than at the beginning. The appetite was very slight at this period and there is no doubt that the animals were in a state of partial inanition. To this state of inanition can almost certainly be attributed the failure of sugar to appear after the injection of adrenalin. This is indicated by the fact that in the case of the two dogs just mentioned large quantities of sugar appeared in the urine after small injections of adrenalin made after a two weeks interval in which the animals took a liberal amount of food.

Why the symptoms following intraperitoneal injections should grow less pronounced with repeated doses is not yet clear. In regard to these effects a condition of actual tolerance seems to become established. It cannot be said that our experiments prove that no tolerance to the glycosuria-inducing action of adrenalin is established as the result of repeated injections. Such a tolerance is observed in the case of morphine and apparently depends on an increased oxidizing activity on the part of the cells.

Symptoms of Intraperitoneal Injections.—Within a few minutes after the injection of an ordinary dose of adrenalin the animal vomits. After 20 minutes or half an hour, a period of intense excitement and restlessness usually sets in and lasts for about an hour. This condition is followed by a period of prostration, which is often pronounced in small dogs. The day following the injection the appetite is usually entirely lost. On the second day the animal begins to eat again and the signs of prostration are no longer noticeable.

After fatal doses (10-12 c.c. in dogs of 5-8 kilos) the symptoms are similar to those described, but more intense. There is repeated vomiting in many instances and a bloody diarrhea is usual. The prostration after the period of excitement is profound and death commonly ensues within 24 hours. At autopsy the intestine is found to be the seat of intense congestion or hemorrhage into the mucous and submucous layers and the greater part of the intestinal tract may be denuded of its epithelium. The pancreas may be the seat of numerous hemorrhages and local necroses, but in other parts the normal appearances may be preserved.

Glycosuria after Local Applications of Adrenalin.—At an early period of the research it seemed desirable to determine whether the greater efficacy of the intraperitoneal method in the production of glycosuria was dependent on the better opportunity for the local action

of the adrenalin on the pancreas. The pancreas was therefore exposed in a number of normal dogs and adrenalin applied directly to the presenting surface by means of a brush. It was found that marked glycosuria follows the application of small quantities of adrenalin to the pancreas, quantities which when applied locally to other parts of the body either give rise to no excretion of sugar, or to a trivial glycosuria.

As a rule the local application of adrenalin to the pancreas leads in a few moments to a deepening in the color of the gland at the area of contact. Sometimes this local reddening of the surface of the gland is preceded by a marked pallor of the organ, but this appears to be exceptional. The glycosuria usually sets in promptly after an application of 1 c.c. of a 1-1000 solution of adrenalin chloride. Usually sugar may be detected in the urine within an hour of the application. It has been observed within ten minutes of the painting. Sometimes one or two hours have elapsed before sugar was detected. The minimal dose which is capable of inducing glycosuria has not been determined, but it seems probable that in some small well-fed dogs less than 0.5 c.c. of adrenalin (1-1000) would suffice to cause some degree of glycosuria.

Examples of glycosuria from local painting of adrenalin are the following:

1. Both surfaces of the pancreas of a dog of 10 kilos were painted with adrenalin (2 c.c. of 1-2000 solution of adrenalin chloride). Within 10 minutes the urine contained more than 5 per cent. of sugar.

2. Dog, 8.4 kilos, one c.c. of adrenalin (1-1000) was painted on the pancreas of a dog that had been fasting for two days. Two hours 10 minutes after, the urine contained 2.8 per cent. sugar.

3. Dog, 8.5 kilos. The pancreas was painted with 2 c.c. of adrenalin (1-1000). Three hours after, 0.4 c.c. of urine have a strong reducing action.

Control Experiments.—It was of course of the first importance that control observations should be made in order to determine whether applications of adrenalin to other organs than the pancreas are not followed by glycosuria. The following notes indicate the nature of the results attending such control experiments.

1. Dog, 10 kilos, spleen exposed and painted with two c.c. adrenalin (1-1000). During the second 15 minutes urine shows slight reduction (slight yellowish residue on casserole). Other samples negative.

2. Dog, 11 kilos, fed upon sugar. Two and one-half c.c. adrenalin injected directly into the liver substance. Small sample of urine after 3 hours contains 0.7 per cent. sugar. Other collections negative.

3. Dog, 10 kilos. Two c.c. adrenalin with 2 c.c. water injected into into mesenteric vein. 1¾ hours after, urine contained 0.2 per cent. sugar.

4. Dog, 7.5 kilos. Three c.c. adrenalin and 3 c.c. water injected into mesenteric vein. After 1 hour 10 minutes sugar 1.11 per cent.

5. Dog, 9 kilos. Two c.c. adrenalin painted on surface of liver. 1½ hours after, urine negative.

6. Dog, 8 kilos. Two and one-half c.c. adrenalin with 2½ c.c. water injected into mesenteric vein. One hour 20 minutes after injection urine contained less than 0.5 per cent. sugar.

7. Dog. One c.c. adrenalin applied to surface of piarachnoid. Urine negative.

These and other observations show plainly that the local application of adrenalin to the pancreas is distinctly more effective in causing glycosuria than is its contact with the liver, spleen or brain. It should be noted that although in several of the control experiments much larger quantities of adrenalin were used than in the case of the applications to the pancreas, the percentages of sugar in the urine were small. It seems extremely probable that when adrenalin is infusd into a mesenteric vein rather rapidly, as in these experiments, a small amount of the substance reaches the pancreas and acts upon its cells. On the other hand it is not improbable that in the case of the experiments where adrenalin is painted on the surface of the pancreas a very small quantity of the active material reaches other parts of the body. Since we cannot completely exclude from the circulation the pancreas without producing glycosuria we are unable to say whether the contact of adrenalin with other cells than those of the pancreas is or is not capable n itself of inducing glycosuria. We may, however, feel certain that applications of adrenalin to pancreatic cells are peculiarly effective in the production of glycosuria. The difference between the behavior of pancreatic and other cells in this respect is so pronounced that we are justified in regarding the glycosuria of adrenalin as pancreatic in character.

The pronounced nature of the glycosuria following intraperitoneal injections appears to be mainly attributable to the readiness with which the adrenalin comes into contact with the pancreas. Experimental injections of colored fluids into the peritoneal cavity give support to this view. Other experiments, which need not be described here, show that when the pancreas is rendered comparatively inaccessible to intravenous and intraperitoneal doses of adrenalin the glycosuria is less than would otherwise be expected.

Nature of the Action of Adrenalin on the Pancreas.—The well-known vasoconstrictor action of adrenalin naturally suggested that the explanation of the glycosuria was to be sought in a derangement of the circulation in this gland, probably one induced by narrowing of the arteries. Two observations, however, had been made which appeared opposed to this explanation. In the first place the local application of adrenalin is followed by an appearance of congestion and not usually by blanching. Secondly it was found that after intravenous injections of adrenalin followed by marked glycosuria the pancreas in several instances showed on inspection no alteration in color, which could be interpreted to indicate a change in the caliber of the afferent vessels. Further investigation of the subject showed very clearly that substances may be applied to the pancreas which cause marked congestion but no glycosuria. On the other hand it was found that a blanching of the gland, as from a 3-per-cent. cocaine-hydrochlorate solution, was not followed by glycosuria, though there is no doubt of the vasoconstrictor action of the drug when thus applied. It was also noted that substances which like amyl nitrite exert a vasodilator action are capable (at least under some conditions) of inducing marked glycosuria when applied directly to the gland. It is therefore impossible to establish any definite relation between glycosuria and the vascularity of the gland or of parts of the gland. It was further observed that there is no relation between elevation of the blood pressure and the glycosuria. Adrenalin was injected into the peritoneal cavity together with sufficient nitroglycerin to keep the systemic pressure much below normal. Yet glycosuria of the usual degree was observed.

While these various experiments do not prove that vascular derangements of the pancreas are of no significance in connection with the production of adrenalin glycosuria, they nevertheless point to the conclusion that if such derangements have a part in determining the glycosuria it must be of secondary importance.

Before obtaining a clue to what we believe to be the correct explanation of the nature of adrenalin glycosuria a number of experiments were made with a view to determining whether the blood drawn from the pancreaticoduodenal vein at the height of adrenalin glycosuria contains any substance capable of inducing glycosuria when injected into the portal system of a normal animal. The observations indicate that even large quantities of blood obtained in this way cause for the most part only a slight glycosuria. As this line of investigation did not appear promising it was not carried sufficiently far to prove whether the glycosuria noted might not be dependent on the increased sugar content of the injected blood or (what seems improbable) on the presence of unchanged adrendalin in the blood.

The Action of Dilute Solutions of Potassium Cyanide on the Cells of the Pancreas.[1]—We are indebted to Prof. Jacques Loeb for calling our attention to the important work of Geppert[2] on poisoning by hydrocyanic acid. This suggestion was of much value for our work as it has given us at least a clue to a better understanding not merely of adrenalin glycosuria but of other forms of glycosuria and diabetes. The fact was well known to Claude Bernard that when animals are poisoned with hydrocyanic acid the blood in the veins grows lighter in color and may assume a bright arterial hue. The explanation of this striking phenomenon has been given by Geppert in his classical work. This investigator showed that in experimental hydrocyanic poisoning the blood of the veins contains much less carbon dioxide than normal and much more oxygen, the percentage of oxygen falling only a little below that of the arterial blood. He further showed that the oxygen utilized in the organism is markedly diminished. A very careful scrutiny of all the facts brought out by Geppert's experiments fully justifies the conclusion that the disturbance in the gas exchanges of the body are referable to the poisonous action of hydrocyanic acid on the cell protoplasm of the organism. This action is of such a nature that it prevents the cells from taking oxygen from the blood as in health. Hence the blood of the veins assumes an arterial tint.

With a knowledge of Geppert's work in mind it seemed very desirable to try the effects of hydrocyanic acid on the cells of the pancreas, with a view to testing the idea that local disturbances of oxidative function, limited wholly or very largely to this particular group of cells, might give rise to glycosuria. The experiments which have been made bear out the correctness of this idea. A typical experiment is the following:

Dog about 7.5 kilos, urine normal. 0.5 c.c. of $\frac{N}{1000}$KCN solution was applied to one surface of pancreas, which became bright red. After 30 minutes the urine showed decided reduction of Fehling's solution. After about 1 hour, urine negative. Then another application of about 2 c.c. of same solution to surface of gland; also 1 c.c. injected slowly into gland. After 1 hour urine had 2.1 per cent. of glucose; 2d hour 0.85 per cent. glucose, 3d hour, slight reduction.

Control Experiments.—The importance of control experiments is of course evident. The following observations are instructive in this connection, as checks to the pancreatic applications.

1. Dog, about 17 kilos. Loop of small intestine painted several times with $\frac{N}{1000}$KCN solution (say 1-2 c.c.), then 2 c.c. of the same solution injected into the subperitoneal layer of the intestine. Urine negative.

2. Dog, about 10 kilos. Three c.c. $\frac{N}{1000}$KCN solution injected slowly into mesenteric vein. 1 hour and 10 minutes later, urine absolutely negative.

These experiments and others of the same character leave no doubt that the absorption of minute doses of hydrocyanic acid by the cells of the pancreas is followed by a glycosuria of short duration. In the change in the color of the gland we have ocular evidence of the action of the poison in preventing the cells from taking up oxygen as under physiological conditions.

The results of experimentation with potassium cyanide made it important to determine the local effects of some members of that large group of substances which have an energetic reducing action. It was thought that the use of such reducing substances might interfere with oxidation within the pancreatic cells and thus give results comparable with those obtained with potassium cyanide.

Effects of the Application of Reducing Substances to Pancreas.—Only the briefest references can here be given to the action of the various reducing substances which were employed.

Sulphurous Acid (SO_2).—An application of 0.5 c.c. of a saturated aqueous solution of SO_2 was made to the pancreas of a dog of 7 kilos. The gland whitened as from coagulation of proteids. Urine before operation negative; 45 minutes later about 2 per cent. sugar.

Ammonium Sulphide ($(NH_4)_2S$.—The pancreas of a dog of 5.5 kilos was painted with 0.5 c.c. of an ammonium sulphide solution made by passing sulphuretted hydrogen through standard ammonium hydroxide solution of 0.96 sp. gr. Urine 1 hour after showed slight reduction, 3 hours after, about 1 per cent. of reducing substance. In a second experiment of the same kind the glycosuria was less marked.

Sulphuretted Hydrogen.—A small current of sulphuretted hydrogen was allowed to flow against the surface of the pancreas for 15 minutes. The dog weighed 10 kilos. 2 hours later the urine showed slight reduction.

Illuminating Gas.—A stream of illuminating gas was allowed to flow against the surface of the pancreas of a dog of 19 kilos for one hour. Urine after this contained 1.7 per cent. of reducing substance.

Carbon Monoxide. (CO)—Twenty liters of pure carbon monoxide warmed to the body temperature were allowed to flow for one hour against the pancreas of a dog of 7.8 kilos. The urine after this contained a small quantity of reducing substance.

Benzyl Alcohol. ($C_6H_5CH_2OH$)—Two c.c. of benzyl alcohol were applied to the pancreas of a dog of 12 kilos. 3 hours later the urine contained 3.57 per cent. of sugar. The color of the gland deepened, but there were no indications of coagulation.

Pyrogallol and Allied Phenols.—The well known affinity of pyrogallol (1-2-3 trihydroxybenzene) for oxygen suggested the use of this substance, which was employed in aqueous solution without addition of alkali. The following are typical results of trials made with this substance.

1. Dog, 6.4 kilos. The pancreas was painted with 1 c.c. of pyrogallol in 1-8 dilution. 3¼ hours after, 30 c.c. of urine contained 8 per cent. sugar.

2. Dog, 6 kilos. Two c.c, of pyrogallol (1-5 dilution) were painted on the pancreas. 2 hours after, urine contained ⅗ per cent. sugar.

Phloroglucin (symmetrical trihydroxybenzene), hydroquinone and pyrocatechin gave much slighter glycos-

[1] Sodium fluoride seems to be an example of a substance which though devoid of reducing action is capable of causing glycosuria.

[2] Ueber das Wesen der Blausäure vergiftung. Deutsch. für klin. Med., s. 208, Bd. XV, 1889.

urias than pyrogallol, but the observations are not sufficiently numerous to be conclusive.

Pyridine, Piperidine and Quinoline.[1]—Experiments made with pyridine and piperidine, are of a special interest because, as shown by Abel, a conium-like substance is present in the active blood-pressure-raising constituent of the suprarenal gland and this alkaloid is known to contain a pyridine base. Pyridine reduces potassium permanganate in alkaline solution, but not in neutral solution and one would not predict for it a marked action in the production of glycosuria. In four dogs in which a 1-10 aqueous solution of pyridine was painted on the pancreas there followed only slight glycosuria. Piperidine (hexahydropyridine) has a chemical constitution which indicates a much greater reducing activity than that of pyridine. In five dogs in which aqueous solutions of piperidine (1-10 or weaker) were brought into direct contact with the pancreas large percentages of sugar were found in the urine—in one instance 11.7 per cent. It should be stated, however, that in another dog piperidine failed to cause the appearance of sugar. Here the failure of the sugar to appear did not appear to be connected with the quantity of piperidine used, for many times the usual dose was applied in this instance without leading to glycosuria. The explanation of these exceptional cases is not yet clear. In two instances in which the sugar of the blood has been determined the glycosuria after piperidine has not been associated with an increase of blood sugar, which suggests that there may be a renal element in these glycosurias. Quinoline appears to stand midway between pyridine and piperidine in its ability to produce glycosuria.

The Relation between Adrenalin Glycosuria and the Reducing Action of Adrenalin Chloride.—The observations to which reference has been made rendered it not improbable that the action of adrenalin in causing glycosuria is connected with its reducing activity. It was very easy to demonstrate that any oxidation of adrenalin chloride outside the body, which deprives it of its reducing power and of the characteristic Vulpian reaction with ferric chloride, also destroys its action in raising the blood pressure and in causing glycosuria. Numerous experiments with oxidizing agents including potassium permanganate and chlorine gas showed that adrenalin thus deprived of reducing action could be injected intraperitoneally in large amounts without producing any glycosuria or indeed any symptom whatever. The chemical nature of the substance or substances that result from the oxidation of adrenalin chloride is not yet known. Violent shaking with considerable volumes of neutral oxygen for periods of one or two hours caused a reddening of the adrenalin solution, but failed to deprive it of the ferric chloride reaction or of its ability to induce glycosuria.

Control Experiments with Substances which do Not Reduce.—The importance of control observations makes it desirable to give brief abstracts of some individual experiments which were made as checks to the studies with reducing substances.

1. Dog, 7 kilos. Two c.c. of a 13.5 per cent. ferric chloride solution painted on pancreas which whitened from coagulation. Urine 1 hour and 3 hours later negative.

2. Dog, 9 kilos. A 5-per-cent. sodium-chloride solution (of about body temperature) was allowed to flow on surface of pancreas for 20 (?) minutes; 280 c.c. were used; 1 hour later 30 c.c. urine gave less than 0.1 per cent. of reducing substance on long boiling. Five c.c. of this urine with 10 c.c. Fehling's solution caused no reduction. 5 hours later urine doubtful, possibly slight reduction.

3. Dog, 9 kilos. Ten per cent. solution of sodium hydroxide painted on pancreas, 1 c.c. being used. One hour later urine gives slight but undoubted reduction. 2½ hours after, slight reduction. 4 hours after, no reduction. 5 hours after, no reduction.

4. Dog, 7 kilos. One c.c. 10 per cent. hydrochloric acid painted on pancreas. 1, 3 and 5 hours later urine shows no reduction. A similar experiment gave a negative result.

5. Dog, 7.5 kilos. Pancreas painted with 3 c.c. bromine water. After 1 hour very slight reduction (trace). Later collections negative.

6. Dog, 8 kilos. Pancreas painted with 3.6 c.c. chlorine water. Urine, several collections, negative. Second collection (after 2¾ hours) slight suspicion of reduction, probably negative.

7. Small dog. Pancreas painted with 2 c.c. fresh hydrogen peroxide (Marchand's).

8. Dog, 6 kilos. Pancreas painted with 2-per-cent. solution of chromic acid, 2 c.c. used. No symptoms. Urine negative.

9. Dog, 1.4 kilos. Two c.c. of a saturated solution of $KClO_3$ were painted on the pancreas. 2¼ hours after urine negative.

10. Dog. 9 kilos. Two c.c. of 2 per cent. HNO_3 solution were painted on the pancreas. Urine negative.

This group of control experiments shows quite clearly that applications which are by no means indifferent in character may be made to the pancreas without causing glycosuria. Some of these substances have neither reducing nor oxidizing qualities, but are nevertheless distinctly injurious. Thus ferric chloride and hydrochloric acid coagulate the protoplasm of the cells with which they come in contact, and there can be no doubt that a 5-per-cent. sodium-chloride solution disturbs the normal osmotic relations. Other substances used possess a strong oxidizing action but failed to cause the appearance of sugar.[1]

Relation between Experimental Pancreatic Glycosuria and Interference with Normal Oxidations of Pancreatic Cells.—The experiments heretofore made indicate plainly that a close relationship exists between the reducing power of a substance and the capacity of this substance to induce glycosuria when applied directly to the pancreas. There are indeed substances which possess active reducing power, but which have yielded only slight degrees of glycosuria.[1] On the other hand there is at least one poison, hydrocyanic acid, which is capable of bringing on glycosuria although it exerts no reducing action. As yet we have found no oxidizing agent which causes glycosuria when applied to the pancreas, but it is possible that such an agent may in time be discovered. Our present experience indicates that substances which have a strong reducing action are very much more likely to induce glycosuria than those which lack this power, although it also indicates that the ability to produce glycosuria is not always proportional to the reducing activity as measured *in vitro*. Thus a solution of adrenalin chloride of a given reducing power will cause much more glycosuria than a solution of hydroquinone of the same reducing activity. Nevertheless it appears that among substances of allied chemical constitution the ability to induce the appearance of sugar in the urine is at least roughly proportional to the reducing activity. We see this among substances of the pyridine and phenol groups.

It is not yet clear what interpretation should be put on the association of the power to reduce and the

[1] Salicylic acid gives rise to marked glycosuria when applied to the pancreas.

[1] Sodium thiosulphate is a powerful reducing agent, but has not yet yielded glycosuria in the course of our work.

power to induce glycosuria. The striking case of hydrocyanic acid which acts by poisoning the cell so that it no longer takes up oxygen normally, suggests that the various reducing substances act by removing oxygen from the pancreatic cells. The quantity of oxygen thus removed can be calculated. It is so small in the case of a powerful glycosuria-inducing agent like adrenalin that we must hesitate to ascribe the appearance of sugar to the mere removal of this small amount of oxygen from the cells. Moreover we know that there are substances with marked reducing action which induce only slight glycosuria and are acquainted with at least one poison (hydrocyanic acid) which induces glycosuria, without having any reducing action. We are therefore inclined to attribute the glycosurias we have noted not necessarily to the reducing action of the substances concerned but to some toxic action on the cells. This action is, however, closely connected with the power of reduction. It is possible that in some instances (as in the case of carbon monoxide poisoning) the quantity of oxygen removed from the cells is sufficient to account for the disturbance in the function of the gland.

Of the intimate nature of this functional disturbance we know nothing as yet. The instructive case of potassium cyanide suggests that in many cases the cells are poisoned in some way which interferes with their oxidative activities.

The discussion of hypotheses relating to this fundamental question will not be undertaken here.

On Glycosurias following Applications to One Portion of the Pancreas.—Early in the course of the study of adrenalin glycosuria it was observed that the reddening of the gland which commonly follows immediately upon an application of adrenalin is localized to the area of contact and superficial. This observation raised the question whether the action of the adrenalin is actually limited to the parts which show an alteration in color or whether there is a diffusion of the substance through the gland, such as must occur when an intravenous infusion of adrenalin is followed by glycosuria. In order to form an opinion on this important point a special form of experiment was devised. The pancreas was cut through, at right angles to its axis, and the incision was carried through the adjoining duodenum. The bleeding vessels having been clamped or tied an application of adrenalin chloride was made to one portion of the pancreas, special care being taken that none of the substance should come into contact with the unpainted part of the gland. This form of experiment was used not merely with adrenalin but with potassium cynaide and pyrogallol. The following notes indicate the nature of the results.

1. Dog, 4.5 kilos. Pancreas divided into two portions, a splenic one-third and a cephalic two-thirds. The splenic one-third was painted with 1-1¼ c.c. adrenalin chloride (1-500). 1½ hours after, 13.5 c.c. urine contained 10 per cent. of sugar.

2. Dog, 7.4 kilos. Pancreas divided into a cephalic one-fifth and a splenic four-fifths. The cephalic fifth was painted with 1 c.c. adrenalin chloride (1-500). 1½ hours after, 8½ c.c. of urine contained 3-4 per cent. sugar.

3. Dog, 9.5 kilos. Pancreas cut into two nearly equal parts. Splenic half painted with 1 c.c. $\frac{N}{1000}$ KCN solution, also 1 c.c. of same solution slowly injected into this part of the gland. Thirty minutes after injection urine contained 6 per cent. sugar.

4. Dog, 7.4 kilos. Pancreas cut into a cephalic three-fifths and a caudal two-fifths. Splenic two-fifths painted with 1½ c.c. $\frac{N}{1000}$ KCN solution. Two hours later 5 c.c. urine contained about 1.5 per cent. sugar.

5. Dog, 10.1 kilos. Pancreas divided into a caudal two-thirds and a cephalic one-third. Cephalic end painted with 1 c.c. pyrogallol solution (1-5) (not rendered alkaline). 1¾ hours after 4 c.c. urine show slight reduction. Two c.c. of urine with 10 c.c. Fehling gave yellow deposit on casserole.

What interpretation are we to put on these experimental results? So far as the pancreas is concerned the glycosuria which follows the local application to one portion of the gland must depend either on the absorption of the toxic substance by this portion of the gland alone or upon absorption by the unpainted as well as the painted portion. In the former case we must suppose that the substances applied to the gland do not enter the blood in sufficient amount to exert any effect upon the remaining piece of the pancreas. In the latter case we must suppose that these substances do enter the blood in an amount sufficient to act on the detached piece of the gland. If the latter view is correct we are dealing with a phenomenon comparable to the elimination of function that occurs when much the greater part or all of the pancreas of a dog is extirpated. But if this view be not correct, and the glycosuria arises from an effect limited to one part of the pancreas we are dealing with a phenomenon very different from the glycosuria of total extirpation. This conclusion is forced on us by the fact that a glycosuria may follow an application to much less than one-half the pancreas, whereas, as is well known, the extirpation of one-half the pancreas from the dog is only exceptionally followed by sugar in the urine. Owing to experimental difficulties which need not here be considered it has not been possible to decide this important point definitely.

Control experiments already referred to, together with others that have not been mentioned, indicate that doses of potassium cyanide from four to six times as large as those required to induce glycosuria when applied to the pancreas, fail, when infused into the circulation, to cause the appearance of sugar. This fact renders it extremely improbable, in the case of hydrocyanic acid at least, that any of the poison painted on one portion of the severed pancreas, reaches the remaining portion of the gland. If this view should prove the correct one it carries with it important physiological corollaries, which will be fully considered in another publication. The evidence at hand points to a positive specific action on the cells of the pancreas and not to a mere elimination of function, as in the case of glycosuria from pancreatic extirpation.

Relations between Human Glycosurias and the Experimental Glycosurias from the Action of Reducing Substances and other Poisons.—It is proper to refer briefly to the bearing of this research upon the interpretation of the phenomena of human glycosuria and diabetes. Our experiments show that a large variety of substances applied to the pancreas in the dog are capable of inducing glycosuria, probably by interfering in some way with the oxidations carried on by the pancreatic cells. The very intimate connection of the pancreas with these glycosurias leads one to ask whether there are not many examples of human glycosuria of similar origin. The glycosuria following conditions of asphyxia, as for instance after epileptiform seizures, can probably be referred to interference with the oxidations in the pancreas. The glycosurias noted after poisoning with carbon monoxide can, we believe, almost surely be explained by the effects of this gas on the pancreas. In the case of the ordinary chronic forms

of human diabetes, with or without marked lesions in the pancreas, we are not yet in a position to speak positively, but our research suggests an explanation which may apply to many instances of this sort. It has long been known to physiologists that easily oxidizable reducing substances are constantly being produced in the organism and that the combustion of these substances is one of the fundamental activities of living protoplasm. We know that at least one gland, the suprarenal, produces a reducing substance[1] which is of great importance for the maintenance of the general vascular tone, and it is likely that there are other reducing substances formed by other kinds of cells, dextrose itself being for the moment left out of account. The blood containing these bodies streams through all parts of the animal mechanism including the pancreas. If now we imagine a disturbance in the normal balance between the oxidizing activities of the pancreatic cells and the production of reducing substances in other parts of the organism, it is easy to understand how a functional inadequacy of the pancreas might arise which would interfere (through an unknown mechanism) with the normal combustion of sugar and its appearance in the urine.

If this conception be correct the presence or absence of glycosuria in any organism may depend on the relation between two variable factors, production of reducing substances on the one hand and oxidative pancreatic activity on the other. The effect of an excessive production of reducing substances (as from diseases of the suprarenal gland) would be equivalent to a reduction in the efficiency of the pancreatic cells. In most cases of diabetes both factors may co-exist. Such a conception of the nature of diabetes helps to explain those instances where the pancreatic lesions are slight in degree.

This idea is put out as a suggestion, not as a fact. A large amount of very careful experimental work, involving a nice technic, is necessary to determine whether it has any substantial foundation. The establishment of the fact that the blood of some diabetic patients contains an excess of reducing substances, other than dextrose, would give substantial support to the conception here advanced.

Histological Alterations in the Pancreas and Experimental Pancreatic Glycosuria.—Experiments to which no reference has yet been made indicate that histological alterations in the pancreas are not a necessary condition of adrenalin glycosuria. Bits of pancreas removed before the production of such glycosurias were compared with bits removed at the height of the sugar excretion. Tissues fixed in Ohlmacher's fluid and in formalin and stained by the ordinary methods[2] failed to show recognizable alterations.

After fatal doses of adrenalin by peritoneum the pancreas may be the seat of focal necroses and the islands of Langerhans may be the seat of destructive changes, but we attach no significance to these lesions in their relation to glycosuria.

It is instructive to note that glycosuria may follow the application of various substances to that portion of the pancreas which contains very few of the cell clusters of Langerhans. It is impossible to state whether a more marked glycosuria follows applications to the tail of the organ (rich in islands of Langerhans) than to the head. Perhaps a large number of experiments made under conditions nearly alike, would throw some light on this point, but a small number of observations could not decide it. The observations which have been made do not indicate any distinct difference in the results from painting the tail and painting the descending cephalic part, which in the dog is most free from Langerhans' islands.

The Physiological Significance of the Experimental Method Employed in this Research.—It has been shown that various substances applied directly to the pancreas are capable of acting on the cells of this gland in such a way as to induce glycosuria. Evidence has been brought out which makes it in a high degree probable that these substances, so varied in chemical composition, act through their interference with the oxidations normally carried on by the protoplasm of the pancreatic cells, though in a manner as yet unknown to us. The fact that so many substances which interfere with oxidative processes are capable of inducing glycosuria deprives adrenalin glycosuria of some of the special significance which attached to it before it was discovered that so many allied varieties of pancreatic glycosuria are readily induced.

The case of adrenalin glycosuria will always be invested with that special interest which comes from circumstances that adrenalin chloride is representative of an important internal secretion. It is, however, an essential gain to physiology that we now recognize the glycosuria from suprarenal extracts to be a particular example of glycosuria from reducing substances rather than a wholly isolated and unrelated form of disturbed carbohydrate metabolism.

But just as we must look upon adrenalin glycosuria as one of a large number of forms of pancreatic glycosuria from some derangement in the oxidative functions of a particular gland, so must we look upon all pancreatic glycosurias from disorders of oxidation, as a particular case of disturbed oxidation. By means of local applications of substances like potassium cyanide, adrenalin and piperidine to other types of animal cells we can interfere profoundly with the oxidations there carried on. Thus it seems likely that we possess a method which will teach us much of importance about the metabolic activities of the kidneys, the muscles and perhaps the nervous system. Interference with the activities of the pancreatic cells gives us a striking signal, glycosuria, but there is every reason to think that other groups of cells may be thrown out of action with equal precision, if not with equally obtrusive metabolic effects. The kidney of one side can be thrown out of function, so far as oxidations are concerned, without gross mechanical insults. One would expect that while the "vital" functions are thus placed in abeyance the processes of diffusion and filtration would be little disturbed. By means of such a method it seems not unreasonable to hope for new light as to the origin of uric acid, glycuronic acid, hippuric acid, etc.

Experiments which we have made suggest that there are other substances than phlorhizin which, acting on the cells of the kidney, lead to glycosuria. It is not impossible that adrenalin while acting chiefly on the pancreas, when intravenously infused, acts also on the kidney. On this and allied topics a further report will be made.

At present it is desired that our research be regarded as an introduction to a better knowledge of the all important subject of oxidations and reductions in the organism, as well as a contribution to the pathology of adrenalin glycosuria.

Note A.—It is desirable to make reference to certain conditions of the experiments which constitute the basis of the research. The dogs used were well nourished and

[1] The following demonstration of the reducing activity of this gland is very striking. If a dog be injected with a preparation of alizarine blue, the blue particles will be found in those organs which have little or no action in reducing the pigment to a colorless substance. But in cells which reduce strongly (muscles, lungs, suprarenal gland) the blue color rapidly disappears and the suprarenal gland appears in striking contrast to surrounding structures.

[2] Dr. E. K. Dunham and Dr. Alice C. Brown were so kind as to make these preparations.

were operated upon within 24 hours after a meal of raw beef, which with few exceptions was the habitual diet. Previous to each experiment the urine was carefully removed by catheter and examined for sugar, the bladder being thoroughly emptied. In all cutting operations the animals were fully anesthetized with ether. They were taken from the holder promptly after recovering from the effects of ether, in order to have them under comfortable and natural conditions. Morphine and other substances which cause the appearance of reducing substances in the urine were never employed as narcotics.

Note B.—It will naturally occur to the reader that the substances employed in the experiments may have passed into the urine unchanged, thus accounting for some reducing action on the part of the urine. In the case of adrenalin and piperidine the reducing power of the small amounts actually used is so small that it would entirely fail to account for the sugar which was detected, even if the entire quantity used came through unchanged. In the case of carbon monoxide the question of passage into the urine does not arise. Sodium fluoride has no reducing action outside the body and that of potassium cyanide is extremely slight. After pyrogallol a fermentable sugar appears in the urine.

For these and other reasons (especially the results of the control experiments) there is no reason to ascribe the glycosurias noted in our experiments to the excretion of the reducing substances used.

ORIGINAL ARTICLES.

SUDDEN DEATH IN AORTIC STENOSIS WITH REPORT OF TWO CASES, ONE COMPLICATED WITH AN ANEURISMATIC-LIKE DILATATION OF THE AORTA AT ITS ROOT AND MARKED STENOSIS OF THIS VESSEL BEYOND THE DILATATION.

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THERE are numerous conditions affecting the vascular system, particularly in the thoracic region, the etiology, pathology and clinical findings of which call for further study and investigation. These affections are scarcely to be regarded as a distinct morbid class, and they are often found in association with disease of the aortic valves. In this connection a brief report of the following case possesses sufficient interest to claim special attention:

A. E. F., aged forty-four years, married, female, accustomed to arduous household duties, but of extremely temperate habits. The mother had died of carcinoma of the stomach, the father of pulmonary tuberculosis at an early period of life. No other hereditary taint discoverable. The patient had had all children's diseases, and later in life two mild attacks of acute articular rheumatism, separated by an interval of seven years. There is no history of any cardiac complications having developed during the attacks of rheumatism. About January 1, 1897, the patient first consulted me on account of dyspnea on the slightest muscular exertion and occasional attacks of palpitation of the heart. There were marked pallor of countenance and slight vertigo, the latter symptom being most marked on rising in the mornings.

A physical examination revealed the presence of aortic stenosis—all of the classic signs being in evidence. Besides, there was the history of previous rheumatic attacks to explain the origin of the condition. The result of treatment was to improve the general condition and to relieve the slight dyspnea, after which the patient dropped from observation. In the fall of 1900 the patient returned with more marked local symptoms, some of which were new, such as frequent constricting cramps and pains, though not severe, radiating to the neck and left arm, and considerable cough. The cerebral symptoms were also more pronounced, the extremities cold, and the general condition feeble. In addition to the signs of aortic stenosis, it was now observed that the aortic second sound was distinctly accentuated, and an abnormal area of dulness about five centimeters in its greatest diameter and extending upward and to the right from the base of the heart was noted. These two signs led to the opinion that the dilatation of the aorta with probable involvement of the sinuses of Valsalva existed. Later an aortic regurgitant murmur became audible, although it was practically masked by the loudness and extremely harsh character of the systolic bruit. The patient's general condition showed slight improvement for a time, but this did not continue and on October 19, 1901, she died suddenly during sleep.

The autopsy was made twenty hours after death, Dr. L. Napoleon Boston assisting. The body of a fairly-nourished, medium sized woman; slight livores. On opening the thorax some serous fluid was found in the pericardium and right pleural sac. The lungs showed no macroscopical lesions. The left ventricle of the heart was considerably hypertrophied and its cavity somewhat dilated, but the muscular structure of the organ did not present any other macroscopical abnormality. The aortic ring and the aortic segments were found to be the seat of marked atheromatous change; the latter were united, puckered and contracted, and of calcareous consistence. These changes occasioned decided narrowing of the orifice and prevented the cusps from falling back into the sinuses of Valsalva during the systole, and offered obstruction to the blood-stream. On passing the index finger from the left ventricle, the valves felt like a hardened, calcareous ring which admitted only the tip of the finger on firm pressure. Above the aortic segments and including the sinuses of Valsalva the aorta was dilated, and the orifices of the branches of the aorta were distinctly atheromatous. The dilated part involved about six centimeters of the aorta and showed an aneurismal-like pouching. For some distance above the dilatation the caliber of the aorta was considerably diminished. The lumen of the anterior coronary artery was not obstructed, but showed some atheromatous patches and it was slightly atheromatous at the orifice. The mitral leaflets and also those on the right heart were normal.

The stenosis of the aorta beyond the dilated portion might be looked upon as a congenital or developmental anomaly. Time was not allowed to examine the aorta throughout its entire course, but it was clearly observed that the stenosis of this vessel was not confined to the isthmus, or that portion between the left subclavian artery and the mouth of the ductus arteriosus—a point at which a moderate degree of congenital narrowing, or more rarely even complete atresia, is not very uncommon. On the other hand there was marked atheroma of the orifices of all of the branches of the aorta so far as this vessel could

be examined. Left ventricle hypertrophy results from these conditions, but in my case the enlargement could be easily accounted for by the aortic stenosis. The diminished caliber of the aorta in the case reported above may be accounted for partly by the slowing of the circulation and lessened volume of the blood entering the aorta owing to the existence of the constricted aortic orifice.

Burke[1] discusses the anatomical and clinical sequences of diminution in the caliber of the aorta and has summarized his results as follows: "(1) Anatomical changes in the (*a*) heart—a left-sided hypertrophy, to which may subsequently be added dilatation of left ventricle and auricle, signs of chronic pulmonary congestion, hypertrophy and perhaps dilatation of right ventricle: (*b*) in the arteries—an arteriosclerosis in young subjects as an expression of long-continued elevation of blood pressure. (2) Clinical appearances—paleness of face, a feeling of oppression in chest, cough with catarrhal expectoration, signs of dilatation, hypertrophy and insufficiency, expansion of the boundaries of the lungs, a chronic bronchitis, increasing weakness of the right ventricle, enlargement of the liver, albuminuria, general edema." In women the condition leads to a primary or even a pernicious anemia. On the other hand, in men the picture is of actual cardiac disease.

Sansom[2] points out that syphilis may not only cause stenosis of the aortic orifice, but also marked narrowing of the first portion of the aorta. Alcoholism has also been assigned as a cause of these changes. While the husband of this patient was syphilized, she herself had never given any symptomatic indications of the presence of this disease. W. B. Hadden[3], Walsham, and others have, however, reported cases of obliterative arteritis in which there was a history of neither syphilis or alcohol. Most writers, and I agree fully, contend that the etiology is somewhat obscure. In my own case the moderate stenosis of the aorta and of the orifices of the branches was ascribed in great part to the previous rheumatic attacks and the hard manual labor.

A point of considerable interest is the strictly localized character of the principal atheromatous changes and their extremely advanced grade. Pure aortic stenosis is unquestionably rare and other conditions are constantly being mistaken for this lesion. Broadbent[4] says that aortic stenosis is the least common of the valvular affections of the left side of the heart as shown both by statistics and by clinical experience. Kelynack[5] states that among 1,635 cases examined while pathologist to the Manchester Royal Infirmary, he found five examples in which the aortic stenosis could be considered the essential feature. A considerable number of instances in which aortic stenosis was associated with mitral stenosis and also many in which aortic incompetency was conspicuously combined have been met by both pathologists and clinicians, but these do not concern us at present.

The diagnosis of aortic stenosis is too often made without due caution and reserve, and I shall embrace this opportunity to point out that the comparatively rarity of the affection is not fully appreciated by the profession at large. When all of the characteristic signs are present, we are justified in making a diagnosis with a feeling of assurance, but if there be missing certain of these cardinal signs—I refer particularly to the systolic basic thrill and the characteristic pulse—a certain diagnosis should not be ventured, for the reason that the chances of error are too great, there being a number of conditions other than aortic stenosis that may give rise to a basic systolic murmur and certain additional signs of constriction at the aortic orifice. In my case it was felt that the thrill and loud bruit which was conveyed to and clearly detected over the right subclavian artery might be to some extent at least occasioned by an obliterative arteritis affecting this vessel. Dr. Mahomed[1] mentions a case of obliterative arteritis of the subclavian, aorta and coronary arteries in which the diagnosis of aneurism had been made during life. A thrill and bruit had been observed over the subclavian and also anginal attacks. Percy Gould[2] has recorded a somewhat similar case.

Moreover, appreciating the fact from previous experience and observation that dilatation beyond the aortic ring, which was present in the case that forms the basis of my paper, will produce a systolic basic murmur irrespective of aortic stenosis, I should not have made an assured diagnosis of this lesion had not all the diagnostic signs other than the murmur been present also, and that prior to the development of the signs of aortic dilatation. To discuss the differential diagnosis of basic systolic murmurs would lead me beyond the scope of my paper; but I venture to affirm that while the aortic stenosis is, when fully characterized, most readily recognized, on the other hand, owing to the frequent absence of certain cardinal signs, particularly the thrill, the characteristic pulse, and the almost equally common concealment of the degree of hypertrophy by associated emphysema, it becomes the most difficult form of organic valve lesion to recognize with a feeling of absolute confidence in most cases.

The number of proved cases of aortic stenosis, therefore, is small because of the rarity of the concurrence of all of the characteristic signs. Conversely their association in the same case enables us to infer safely the existence of this lesion. These signs are (1) a small, slow and somewhat tense pulse; (2) a systolic basic thrill; (3) an enlargement of the left chamber; (4) a harsh and musical systolic murmur over the aortic area, and a feeble aortic second sound. A

[1] Deut. Arch. f. klin. Med., Oct. 31, 1901.
[2] Diagnosis of Disease of the Heart and Thoracic Aorta, p. 44.
[3] Lancet, Feb. 11, 1888.
[4] Heart Disease, by Wm. Broadbent, p. 124.
[5] Medical Press and Circ., May 11, 1898.

[1] Lancet, Feb. 16, 1884.
[2] Trans. of the Clinical Soc. of London, 1884.

point of clinical interest in connection with the case reported is the greatly increased intensity of the second sound. This was attributed to the dilatation of the aorta above the valves; it does not belong to pure aortic stenosis in which *per contra* the intensity of the second sound is diminished. Moreover, it was not present when the case first came under observation.

It is worthy of note that to the time of death in my fatal case, the murmur was both loud and long, indicating great vigor of the ventricular systole. The extreme loudness of the murmur in this case lends support to the generally accepted view that the sonorous vibrations are generated by the eddies resulting from the passage of the blood through a small orifice into a larger channel, since the aorta was found postmortem decidedly dilated immediately beyond the aortic valves.

Acording to the history of my autopsied case and the evolvement of the physical signs, aortic stenosis existed prior to the occurrence of the dilatation of the aorta. If this be true, it is difficult in the extreme to account for the development of the aortic dilatation above the valves, since aortic stenosis tends by its slower and less forcible distention of the aorta in the systole to produce a narrowing of the root of the aorta. It is to be recollected in this connection that the abnormally contracted condition of the aorta beyond the dilated part may have, by obstructing the blood-stream at that point, increased the tension on the proximal side or in the area embraced by the dilatation. Whatever may have been the cause it was most probably a comparatively sudden yielding of the aorta to the current of the blood.

The questions pertaining to the dangers that attend upon aortic stenosis are not definitely settled. That there is some risk of sudden death, more especially from syncope even in cases in which the symptoms occasioned by the lesion are of a mild character, is I believe, unquestioned. Moreover, this may occur in instances that do not show either obstruction of the coronary vessels, as in my own case and in two of the cases recorded by Kelynack, or any other non-valvular lesion.

Pick[1] also records a case of pure aortic stenosis in which the patient died suddenly in the midst of her work. The diagnosis of thoracic aneurism had been made during life. The constriction was so marked that it admitted only a seven-millimeter sound; otherwise the changes, both local and general, were insignificant. My note-book furnishes a brief history of a second case of uncomplicated aortic stenosis that suddenly terminated life and apparently from syncope, although no autopsy to verify the antemortem diagnosis of pure stenosis was permitted.

The patient was a male, aged sixty years, widower, by occupation a baker, and of German birth. The physical signs were typical. Attacks of syncope occurred and sometimes they caused the patient to fall. Quite severe injuries of the head were sustained on several occasions, and at last after an illness extending over a decade, sudden death supervened. General arteriosclerosis was associated.

The occurrence of unexpected, sudden death in aortic stenosis is a question of considerable interest. It is highly probable from the foregoing facts that, if pure cases only were considered, it would prove to be a not uncommon mode of termination in this exceptional lesion. It must be confessed that I was inclined to attribute the occurrence of sudden death in my autopsied case to rupture of the aneurism, but the postmortem examination showed this view to be erroneous. Neither could it be justly ascribed to coronary disease in view of findings at necropsy.

Kelynack has also recorded a third case which reached an advanced stage, accompanied by dropsy, in which death took place quite suddenly from syncope. This gives us a total of six cases in which sudden death occurred in this affection (and the literature has by no means been exhaustively examined) and in at least four of these no complicating lesions of any moment were noted. Obviously, the end may also be reached in a slow and gradual manner amid the evidences of progressive cardiac failure.

[1] Prag. med. Woch., Feb. 1, 1900.

REMARKS ON THE DIAGNOSIS OF PREGNANCY IN THE EARLY MONTHS.[1]

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THE best evidence of uterogestation at whatever period is to be sought in the characters of the uterine tumor. These pertain in part to the uterus itself and in part to its contents. In the first weeks of pregnancy the ovum occupies a relatively small portion of the uterine cavity. By the end of the third month it wholly fills it. During the greater part of the first trimester the properties of the uterine tumor which appeal to the examining fingers as evidence of pregnancy are wholly or mainly those of the uterus itself, changes superinduced in it by the physiological process going on within. Toward the end of the third month and from that time on palpation is in great part addressed to the ovum as felt through the softened and thinned uterine walls. Soon after the time when the ovum begins to fill the entire uterine cavity the principal indications of pregnancy are what may be termed the fetal signs, such as fetal parts, passive movements, active movements and fetal heart tones.

Obviously the changes in the uterus incident to early pregnancy do not become sufficiently marked to be distinctly appreciable by the touch within a period of several weeks, usually not much before the sixth. Some of them are obscured or lost a few weeks later when the uterus becomes distended by the product of conception.

[1] Read before the New York State Medical Society, Albany, Jan. 28-30, 1902.

During the greater part of the first three months, the structural changes in the uterus itself constitute almost the only reliable objective evidence of pregnancy and some of these changes are sufficiently marked to be available for diagnosis only between the fifth and tenth week or a little longer.

The object of this brief paper is to consider the more valuable signs of pregnancy at this period as elicited by bimanual examination of the uterus with special reference to certain facts that have not been sufficiently emphasized by obstetrical writers.

All the diagnostic properties of the uterine tumor which appeal to the touch in the first three months relate to size, shape and consistence; they may be stated as follows: (1) Softening of the cervix; (2) size of the body and progressive growth at the rate of pregnancy; (3) extreme compressibility of the isthmus, Hegar's sign; (4) relative density of the median and lateral sections of the isthmus; (5) asymmetry and differential density of the body; (6) consistence and shape of the body as a whole.

Changes in the Cervix.—The structural changes in the cervix are not sufficiently pronounced to be of much diagnostic value before the end of the second month. Beyond this period they soon become so. They may be absent, however, during the early months in the presence of cicatricial tissue and they may be simulated by metritis in the non-gravid uterus.

Differential Density of the Isthmus.—A characteristic of the isthmus uteri, which was utilized by the writer for the diagnosis of uterogestation before the publication of Hegar's sign, is a more pronouced softening of the central than of the lateral sections of that segment. The non-gravid uterus presents at the isthmus a relatively dense longitudinal median ridge. In the gravid uterus within the period with which we are dealing the middle portion is less dense than are those on either side of it. This change in the differential density is generally well marked by the fifth or sixth week and it is at least not inferior in diagnostic value to Hegar's sign.

The difference in the relative density of the median and lateral sections is doubtless due to the presence in the former of the thick, soft decidua. From the fifth to the eighth week the thickness of the decidua is about equal to that of the uterine wall. In the gravid uterus, therefore, the isthmus is less resistant to the touch within this area than in the lateral sections where no decidua intervenes between the examining fingers. Relative softening of the median section and compressibility throughout the entire width of the isthmus are not obliterated during uterine contractions.

Hegar's Sign.—Generally, when clearly defined, Hegar's sign may be regarded as absolutely diagnostic. With extremely rare exceptions no pathological condition counterfeits it. While it is true, as certain writers have affirmed, that some degree of compressibility of the isthmus may be present in those very rare conditions hydro- and hematometra, it is not typical. It is not so well defined in proportion to the size of the corpus as in the gravid uterus of similar dimensions. The body of the uterus, too, is more nearly globular than in gestation and it presents the characters of a tense cyst.

In a single instance in the writer's experience Hegar's sign was found perfectly developed in a case of puerperal metritis. Unlike certain other observers he has never met with anything closely resembling it in other forms of metritis. This sign may be looked for after the fifth week. Unfortunately in a small proportion of cases, perhaps ten per cent., it cannot be detected even as late as the eighth. In many women the difficulties of the bimanual examination make this sign of little or no value. Sometimes in such cases it may be elicited by the rectovaginal method, the uterus being well drawn down with traction forceps. In any case failure to find it is not conclusive. Yet Hegar's sign is by some writers given first rank among the earlier evidences of uterogestation. My own estimate is that, while it is not inferior when fully made out to any of the other signs of the early months, its practical value is less than that of the shape and consistence of the corpus for the reason that it is not so readily appreciable.

Differential Density of the Corpus.—Another indication of pregnancy at the period in question is the differential density of the corpus (Braun, Hübl, Winter, Schauta, Dickinson, and others). The impregnated ovum lodges in the uterine mucosa most frequently at a point near one cornu. So long, therefore, as it only partially fills the cavity of the uterus, the corpus presents an asymmetrical shape. One horn or lateral segment of the body of the uterus is denser to the examining fingers than is the other. Whether the ovum is contained in the denser or the softer segment is a matter of dispute. Braun refers the situation of the ovum to the softer horn, Schauta to the harder. A longitudinal sulcus may be made out between the thicker and the thinner cornu upon either the anterior or the posterior wall or upon both, and it may extend over the fundus.

Braun has sometimes been able to recognize the difference in size and density of the two halves of the gravid uterus within a few days after the first skipped period (Trans. Vienna Obstet. and Gyn. Soc., *Centrbl. f. Gyn.*, 23, No. 17). The difference in consistence of the two lateral segments he has generally found most marked upon the anterior wall. He thinks the longitudinal sulcus may, like Hegar's transverse fold of the posterior wall, be an artificial product, the result of irritation incident to the bimanual examination. He calls attention to the possible utility of these signs in deciding whether the ovum has been expelled in abortion and in the diagnosis of early ectopic gestation.

Hübl induces contraction of one-half of the uterus by massaging one horn. The density of

the opposite half remains unchanged. This difference in the consistence of the two horns developed by manipulation is characteristic of pregnancy. Such irregular contraction cannot be induced in metritis.

Schauta alluded to the irregularity in the shape and density of the gravid uterus in the report of his first thousand laparotomies In one case he had operated under a mistaken diagnosis of ectopic gestation, the uterus having assumed a marked bicornate shape, owing to the presence of an ovum in one horn. In the experience of both Schauta and Braun one segment of the gravid uterus has been found so tense and hard in comparison with the other as to lead to the erroneous diagnosis of myoma

Shape and Density of the Corpus as a Whole.—Most easily available of the signs obtainable in the early months by the bimanual examination are marked softening and lateral expansion of the body of the uterus, and it is especially to these peculiarities of the gravid uterus in the early months that it is desired to direct attention. An apparently almost jelly-like consistence of the corpus, together with a width often two or three times its anteroposterior thickness, makes the diagnosis of uterogestation. The softening may be so great that it is only with difficulty that the borders of the upper segment can be mapped out by conjoined manipulation. In no other condition than pregnancy is the softening so marked. This character alone, when pronounced, may safely be taken as proof of normal gestation. No pathological condition counterfeits it. As already observed it is only partially developed before the fifth or sixth week. Again, it disappears toward the end of the third month, owing to distention of the uterus by the growth of the ovum. Between these two periods there is no other evidence of pregnancy which equals in diagnostic value anteroposterior flattening and consequent broadening of the corpus.

It must be remembered, however, that both these conditions disappear during uterine contractions. They are available, therefore, only when the uterus can be caught between contractions. Repeated examinations at short intervals may be necessary. When the uterus is not primarily contracted it soon becomes so under manipulation. During contraction the shape and density are entirely changed. The width of the uterus is less; the density is greater, though not so great as in the non-gravid state; the body assumes an irregular ovoid shape; the anterior wall presents the form classically described as that of a pot-bellied jug. Upon the latter characters which are presented only by the partiality or firmly contracted uterus much stress is laid in the text-books. Yet, they are inferior in diagnostic value to the peculiar softness and great transverse width of the corpus which characterize the intervals between contractions.

Pregnancy and Myoma.—The presence of myomatous growths seriously complicates the diagnosis during the period contemplated in these remarks. An edematous fibroid in the uterine wall may closely simulate pregnancy in so far as relates to the characters of the uterine tumor.

On the other hand a gravid may be mistaken for a myomatous uterus if palpated during the height of a contraction. This mistake has frequently been made by surgeons. Here Hegar's sign and the diminished resistance of the median section of the isthmus may serve to differentiate. Both are present in nearly all cases of uncomplicated uterogestation by the end of the sixth or seventh week. They are absent in the non-gravid myomatous uterus.

Every gynecologist knows how closely the healthy gravid uterus and the myomatous uterus may resemble each other even under ocular inspection.

The foregoing signs may be utilized during operation for confirming or disproving the diagnosis when the abdomen has been opened for a supposed myoma. Obviously the isthmus uteri may be interrogated with more ease and certainty through the abdominal incision than by the usual clinical examination.

In pregnancy coexistent with interstitial myoma these changes at the isthmus will seldom be found. Their presence or absence in the pregnant myomatous uterus will depend on the situation of the morbid growths. When the tumors do not involve the isthmus the same changes may be present in that portion of the uterus as in uncomplicated gestation. Yet the bimanual examination of the uterus for pregnancy is greatly embarrassed by large myomata in any situation.

DIAGNOSIS OF DISEASES OF THE BILIARY PASSAGES.[1]

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IN this paper I shall confine my study to a general consideration of the signs of diseases of the biliary bladder and ducts, and shall indicate the relations of these symptoms to such diseases, giving their diagnostic significance and value. I shall likewise show the significance of the physical signs brought out by the careful examination of the patient and discuss these in relation with the subjective symptoms.

Of all diseases of the various organs by which mankind is afflicted few are attended by such definite symptoms which make their diagnosis at one time very easy and at another most difficult. Diagnosis of gall-bladder disease requires in most instances minute observation, keen perception, mature reflection and logical judgment, or in other words the highest qualities of pure reasoning. It is only in few instances that the average clinician can come to a quick conclusion. This is not to be wondered at when we consider that gall-bladder disease is not, as a rule, attended by any characteristic symptoms or pathognomonic

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signs, that the gall-bladder, by its anatomical situation, its juxtaposition to organs in which disease is common, is frequently an object of diagnostic neglect, whereas, owing to the frequency with which it is involved in some one or other pathological process, it should be the first to be considered in the mental process of exclusion, a method which is very valuable in diagnosis.

The most pronounced signs of gall-bladder disease are the same which are the most marked in disease of the organs in its neighborhood; hence for the recognition of gall-bladder diseases a thorough knowledge of their underlying pathological processes is a *sine qua non*. Without it the finest diagnostic acumen, the keenest perceptive powers are of slight avail. With it not only may a reliable diagnosis be made of a disease of the organ itself, but a most probable conclusion of the condition of the rest of the organ and its ducts. In fact, for the needs of treatment, the surgeon to whom the most of cases of gall-bladder disease are referred, is entitled to demand more than a general diagnosis; he may justly ask for a special diagnosis of the conditions. With the recent advance in our knowledge of cholelithiasis, it is not enough for the internist to say that a patient is suffering with gall-stones; indeed he ought not to resent being called upon for the special pathological diagnosis underlying his general one of cholelithiasis. Of course, such a special diagnosis may not be made in all instances, but he may not infrequently conclude as a special diagnosis, for example, that the gall-stones are in an undisturbed gall-bladder with the cystic duct patent; or again, that an acute purulent cholecystitis with a pericholecystitis and local peritonitis are the concomitant features, or that an obstruction to the common duct is due to a carcinoma of the head of the pancreas. Of course, you may say that an exploratory laparotomy will reveal the true conditions and that the diagnosis of the clinician when he attempts this may often be found wrong. Nevertheless, it should be the object of every well-trained clinician to determine by all the powers which he possesses the special conditions underlying these diseases so that there shall be no need of turning over to the surgeons for exploration, on the one hand, those cases which clinical experience ought to teach would never be benefited by surgical means, or, on the other, to submit patients with medicinally remediable disease to the no small dangers of a laparotomy.

Before proceeding to the consideration of specific diagnosis it will be to our advantage to consider the definite symptoms of which we spoke in our introductory lines, to analyze each and to suggest their diagnostic value and significance.

The only common subjective symptom of gall-bladder disease is pain. The objective signs, independent of those elicited by the examiner, are vomiting, jaundice, swelling in right hypochondrium, and fever, with or without chills. Not one of these symptoms is distinctive of disease of the gall-bladder; each and all may be absent or they may be found just as often in diseases of the viscera in the immediate neighborhood of the gall-bladder. And yet under certain conditions these signs may be most suggestive and directly indicate gall-bladder disease. These conditions necessitate an intimate acquaintance with previous manifestations of disease in the patient. Hence, in no province of clinical medicine is an accurate anamnesis so essential. They likewise presuppose a most accurate and minute examination of these symptoms in all their details as to character, site and intensity. Finally, and most important, is the interpretation of these symptoms in the light of the data which the physical examination by inspection, palpation and percussion reveal.

Let us consider these symptoms *seriatim:*

Pain is the most prominent symptom of cholelithiasis. Its degree of intensity determines to a considerable extent the underlying pathological feature of gall-bladder disease; thus, when slight and unaccompanied by jaundice, it may be indicative of an evanescent serous cholecystitis; when intense and associated with exquisite tenderness so that palpation is almost unbearable, one should suspect an intense suppurative cholecystitis even though jaundice, tumor and fever be absent.

Let us remember that the pain of gall-stone colic is not occasioned in all instances by the attempt of a stone or stones to wander from the gall-bladder. This, I believe, is rarely the cause, except in acute obstruction. I would attribute the attack in most instances to an inflammatory condition, a cholecystitis. That colic frequently occurs without an obstruction or the impaction of a stone in the ducts has been repeatedly demonstrated by surgeons. When such impaction occurs it is usually the effect of the inflammatory process in the gall-bladder by which the bladder becomes distended and its sensory nerves irritated. In acute obstruction of the choledochus the colic is most probably due to the advance of the stone, especially while it is passing through the tortuous cystic duct and through the papilla in the duodenum.

The character, its site, its relation to an empty stomach or to the ingestion of food and drink are points which will differentiate a gall-stone colic from the pain of an ulcus ventriculi.

The appearance of *jaundice* in cholelithiasis indicates that it is not to be attributed to a local affection of the gall-bladder in most instances. Exceptionally, jaundice has been present when the gall-bladder alone was diseased. It may be said that jaundice occurs in gall-stone disease relatively seldom, much less frequently, I believe, than has heretofore been generally supposed. It is especially important to discover whether it appeared immediately after the first attack of pain, how long it continued, what was its intensity and whether this varied at times. The intensity and the varying character of the jaundice determine the question whether there is a chronic choledochus obstruction due to a stone or to a tumor, for in lithogenous choledochus obstruction

the jaundice almost always constantly changes in hue, varying in depth from lighter to darker and to lighter again, and even entirely disappearing; while in obstruction due to pressure of a tumor it constantly increases in intensity as a rule. Occasionally in tumor of the duodenum involving the papilla, jaundice of varing intensity occurs. Such a case came recently under my observation. An inquiry as to the varying presence and absence of bile in the feces will assist in arriving at a conclusion.

It may be stated also, as a general rule, that icterus is absent in inflammatory conditions of the gall-bladder. In fact, in about 80 per cent. of all gall-stone cases icterus does not appear. Therefore when icterus is present, it is wise to look for disease either of the liver or of the biliary passages other than cholelithiasis, unless one has evidence that the jaundice is due to an extension in the ducts of the inflammatory process of a gastroduodenitis or that it is the result of an acute obstruction of the choledochus associated with cholecystitis. In the last case the jaundice disappears with the passage of the stone through the papilla into the duodenum.

Fever.—This is observed very frequently in gall-stone disease and when of intermittent form and associated with jaundice it indicates, as a rule, a stone in the common duct. It may be associated with chills and give the picture of a malarial quotidian, tertian and even a quartan type. Charcot, who first called attention to this in gall-stone disease, named it "hepatic intermittent fever." By some authors this form is supposed to be indicative of a choledochus obstruction by a stone in the ampulla of Vater. One should not forget, however, that the association of fever with chills or the presence of high temperature without chills may accompany an ordinary attack of gall-stone colic, or may be indicative of an infectious inflammation of the gall-bladder or its ducts. Nevertheless, as a general rule, it should be borne in mind that if the fever be of a continuous and remittent form in such cases, one of these conditions may be present—a diffuse purulent cholangitis, a pyelophlebitis or a liver abscess.

Much may be learned from a careful anamnesis when we bear in mind that sex and age are suggestive diagnostic data, in that gall-stones are far more common in females than in males, and much more frequent after twenty years of life. In fact, the frequency is in direct ratio with the number of years after twenty. Obesity is an associated condition in many cases of cholelithiasis. Previous diseases, especially the infectious diseases, prominently typhoid, predispose to cholelithiasis and cholecystitis. Menstruation, pregnancy, the puerperium favor the occurrence of attacks of hepatic colic. Gastroduodenitis is not infrequently associated with cholangitis, and repeated attacks predispose to cholelithiasis.

Physical Examination.—Next to a careful anamnesis, the examination of the patient offers the most reliable data in forming a diagnosis of disease of the biliary passages. An examination which does not include that of all the viscera and which limits itself to the structures in the right hypochrondrium will not infrequently fail to reveal the diagnostic data which shall determine what form of disease of the biliary passages is present. Analysis of the stomach-contents should not be forgotten in cases in which there is a suspicion of carcinoma. The stools should be inspected and the presence or absence of bile noted. I do not think that sifting of the stools gives much information. Of course, when a stone is found in the passed feces, the diagnosis is assured, but this occurs seldom, either because the stone became softened and disintegrated by the intestinal secretions or because it has merely changed its site without having successfully been forced into the bowel. It is self-evident that the urine should also be examined, especially for biliary coloring matter and for albumin.

Most important knowledge is gained by the physical examination of the patient's right hypochondrium, especially by inspection, palpation and percussion; diagnostic data of no small value are derived from them. Thus, by inspection, especially in thin subjects, we may notice a prominence over the region of the gall-bladder, a distended gall-bladder which immediately suggests an occlusion of the neck of the bladder or of the cystic duct, and would exclude in the vast majority of cases a chronic obstruction by a stone in the choledochus. Up to quite recently it had been taught that a distended gall-bladder and jaundice were characteristic signs of an obstruction of the common duct by a stone. Courvoisier, who was the first to analyze by careful study these features, proved indubitably that distention of the gall-bladder was the exception in lithogenous choledochus obstruction. This is now so well established that the fact is known as *Courvoisier's law.* If you can see and feel a distended gall-bladder, whether or not there be jaundice, you may conclude in the largest number of cases that it is not a stone in the choledochus which produces the condition. On the other hand, a distended, palpable gall-bladder, and the presence of jaundice are the usual concomitants of obliteration of the lumen of the common duct by the pressure of a tumor outside of the duct, for example, either of the duodenum or of the head of the pancreas. In the latter cases, when a cachexia and an ascites are accompanying features, showing portal vein obstruction; a diagnosis of carcinoma of one or the other or of both of these organs is justifiable.

Again, inspection may show in addition a depression near the epigastrium which would suggest a dragging upon the pyloric end of the stomach or duodenum by adhesions from a recent or old pericholecystitis. This conclusion will be strengthened if we find that the stomach is distended, which inspection not unfrequently alone substantiates without the necessity of finding its outlines by fillling the stomach with gas through a stomach-tube. Or inspection may disclose an

absence in the gall-bladder region of intestinal peristalsis or a reverse peristaltic movement in that locality, whereupon it would be fair to assume that an inflammatory process had caused adhesions of the gall-bladder to the colon.

Palpation furnishes equally, if not more, reliable information upon which to base a diagnostic conclusion. This should always embrace in addition a bimanual examination by which the size, shape, regularity and tension of a distended gall-bladder can best be determined. In addition the nature of the free edge of the liver may be elicited, and the condition of that organ as to size, smoothness and regularity of contour may be established. A hydrops of the gall-bladder or an empyema from a suppurative cholecystitis appears as a globular or ovoid tumor.

Too strict regard cannot be paid in the absence of a distended gall-bladder to a resistance which palpation may elicit in the region of that organ, because a rigid abdomen is suggestive of an inflammatory process beneath. Nor should one forget that an extension from the edge of the liver in the same locality does not always mean an enlarged gall-bladder. Riedel has shown that in some cases of cholecystitis, the enlarged gall-bladder has pulled down an extension from the liver substance in the shape of a lobule of liver tissue which may cover the gall-bladder or in the event of the subsequent atrophy of the gall-bladder and its retraction high up under the liver, may be mistaken for the gall-bladder. This lobule is known as Riedel's lobe. I mention it here prominently that this condition may be thought of before concluding that a palpable gall-bladder is present.

A nodular condition of the gall-bladder, hard and painful on pressure associated with jaundice, is suggestive of carcinoma of that organ. Should the same conditions coexist in the liver with signs of ascitis and cachexia one may infer that secondary invasion of the liver by carcinoma has taken place.

A crepitating mass in the gall-bladder, feeling like nuts in a pouch, indicates a patent cystic duct with a gall-bladder free from fluid. In a distended gall-bladder, whether due to a serous or a purulent cholecystitis, gall-stones cannot be felt to crepitate by the palpating fingers.

When an ovoid or pear-shaped tumor is felt in the right hypochondrium one should notice whether or not it is painful on pressure and whether it is accompanied by jaundice and an enlarged liver. If not at all or only slightly painful, and not accompanied by increase in the size of the liver and jaundice, a diagnosis of hydrops of the gall-bladder is most probable. An exquisitely painful enlargement of the gall-bladder, even though unaccompanied by fever, which is more frequently present than absent, indicates a suppurative cholecystitis.

Returning again to the consideration of a collection of pus in the gall-bladder as the result of a purulent cholecystitis, we would like to say that such a collection does not always give rise to a palpable tumor. In fact in recurrent inflammations of the gall-bladder a contraction of the walls of the organ may supervene and though the contents are purulent, no tumor may be felt. One must then take into consideration the character of the fever, the presence or absence of pain and tenderness, the anatomical distribution of pain, and the presence or absence of jaundice to come to a conclusion. These are perhaps the most difficult of all gall-bladder affections to diagnose.

Again, palpation reveals the presence or absence of tenderness, the significance of which was considered when we spoke of the diagnostic importance of pain.

Percussion is of importance in fixing the upper and lower borders of liver dulness especially, and giving knowledge of the size of this organ. Enlargement of the liver occurs in cholangitis and in chronic choledochus obstruction, while its consistence it at the same time increased. We spoke of the local enlargement of the liver over the gall-bladder as the result of a cholecystitis, which caused a tongue-like projection to extend downward, known as Riedel's lobe.

When, with other signs of disease of the biliary apparatus, fever, either of a continuous or of a remittent type, associated or unassociated with chills is present, an examination of the blood, especially the estimation of the number of white blood-cells, is desirable. A polynuclear leucocytosis of high grade would suggest the presence of an infectious process or of a purulent accumulation in the biliary organs.

Special Diagnosis.—As a rule, diseases of the gall-bladder are readily diagnosed; sometimes, however, diagnosis is most difficult on account of the absence of physical signs and of definite clinical symptoms. It will be wise to differentiate, before taking up the diagnosis of the special diseases of the biliary apparatus, the conditions with which gall-stone colic may be counfounded.

Gastralgia.—There can be little doubt that many of the so-called cases of gastralgia or stomach cramp are really attacks of gall-stone colic. Gastralgia, as a rule, is attended by physical alterations in the region of the stomach such as retraction or distention, with the stomach outlines at times visible on inspection. An attack of gastralgia terminates with the eructations of copious amounts of gas and the pain is usually relieved by pressure in the epigastrium. On the other hand, in gall-stone colic the pain is rendered much more agonizing by pressure over the right hypochondrium and epigastrium. Of course, later in the attack, the appearance of jaundice, of a tumor on the right hypochondrium or of gall-stones in the stools would decide the cause of the pain in favor of gall-stones. A chill and fever are much more common with the latter than with gastralgia.

Ulcer of the Stomach or of the Duodenum.—When there is a history of pain, hemorrhages from the stomach, and tarry stools there is no difficulty about deciding the cause of these con-

ditions any more than there would be if we found icterus, or hepatic enlargement and stones in the feces. One can, however, in a large number of cases make the diagnosis early from the following data: The pain in ulcer is almost immediately increased after the ingestion of food; it rarely occurs while there is no food in the stomach and is therefore less at night; while in gall-stone colic the paroxysm usually starts in at night some hours after a meal; at any rate it occurs independent of meals. The pain in gastric ulcer, as a rule, does not invade the right hypochondrium and is especially localized in the epigastrium and the left hypochondriac region, while in gall-stone colic the greatest pain is over the region of the gall-bladder. Ulcer is accompanied by a previous history of gastric symptoms and by hyperchlorhydria; gall-stone colic comes on suddenly without premonition and the contents of the stomach do not show a decided increase in free hydrochloric acid. Ulcer is more frequent in the thin and anemic female, while cholelithiasis is especially observed in the obese and plethoric. The presence of an ovoid tumor in the right hypochondrium with colic excludes ulcus ventriculi and favors the diagnosis of colic due to a cholecystitis.

Intestinal Colic.—In this the pain is usually centered about the umbilicus, is not as agonizing as in gall-stone colic and is relieved by the passage of flatus and by firm pressure.

Renal Colic is seldom confounded with gall-bladder colic, as the direction of the pain in the former radiates downward along the ureters and to the testicles and glans penis; it is sometimes accompanied by diminished excretion of urine, which is often dark colored and not infrequently contains mucus, and blood. Hematuria does not occur with gall-sone colic.

Malarial Fever.— When speaking of the significance of fever in gall-bladder disease, I called attention to a form simulating by the periodicity of chill, fever and sweat, the type of a quotidian, tertian and quartan intermittent fever. These symptoms without further examination of all the data furnished by the patient would naturally suggest a malarial infection. A close inquiry will elicit the fact that they may be the expression of a chronic choledochus obstruction from the impaction of a stone, or the concomitants of a suppurative cholecystitis, of a diffuse pyelophlebitis, of an abscess of the liver, or of a diffuse suppurative cholangitis. Even the enlarged spleen of malarial infection may be present with the other infectious processes of the gall-bladder and its ducts. When in doubt the examination of the blood for plasmodium and diagnostic test doses of quinine hypodermically should not be forgotten.

Peritonitis may be confounded with gall-stone disease at times, but it is readily distinguished by the posture of the patient, the permanent as opposed to the paroxysmal character of the pain and by the presence of the costal type of respiration.

Appendicitis has been diagnosed by some of the very best clinicians and on operation an acute cholecystitis has been found instead. The error is more easily made when the appendix is situated higher up than usual or when the pain from the cholecystitis is referred lower than the right hypochondrium. There is usually no jaundice in cholecystitis, a fact which renders a differential diagnosis still more difficult. The presence of local tenderness and of a tumor in the right hypochondrium and the anamnesis showing either a previous history of jaundice or a previous infectious disease, such as typhoid, would point strongly to a cholecystitis.

Ileus may be an obligatory result of an acute cholecystitis, or it may simulate gall-stone disease. When a pericholecystitis results from an acute cholecystitis, adhesions of the intestine and the gall-bladder may occur. During this process the intestine may become paralyzed by the inflammatory process in its peritoneal covering and give rise to constipation and obstinate vomiting, even vomiting of stercoraceous matter. In fact, ileus has been more than once diagnosed, when a cholecystitis was the cause of the obstruction and the instituted laporatomy revealed the true condition of affairs.

Too much attention cannot be placed upon the previous history in such suspected cases. Inquiry should embrace the questions of previous attacks of colic, of jaundice, of painful swelling in the right hypochondrium, all of which, when present, would indicate the true source of the intestinal obstruction.

Hypertrophic hepatic cirrhosis of Hanot can readily be mistaken for chronic obstruction of the choledochus, due either to an impacted stone or to pressure from without. In both there are varying degrees of jaundice, and enlarged liver and fever; in both pain may be absent. The greater enlargement of the liver and the more continuous type of fever are distinguishing features of Hanot's cirrhosis as likewise are youth and a slight degree of jaundice. In hypertrophic cirrhosis the stools are not clay-colored as they usually are at some time during the course of a chronic choledochus obstruction. In the former the spleen is enlarged and hard.

Acute Pancreatitis.—It is well known that this commonly arises as the result of the entrance into Wirsung's duct of irritating chemical or bacterial substances. On this account it is not uncommonly associated with cholelithiasis and especially in chronic forms of impaction in the lower part of the choledochus, either in the ampulla of Vater or at the duodenal papilla, when the bile behind the obstruction becomes dammed back into the pancreatic duct, or infecting organisms enter. At times the co-existence of acute pancreatitis may be suspected when, after a history of gall-stone colic with jaundice, a frightful pain appears in the epigastrium and extends over to the left, and signs of profound collapse supervene. It is almost impossible sometimes to determine its existence.

As a disease not coexistent with cholelithiasis it may be differentiated by the more agonizing nature of the pain, which is referred to the epigastrium and to the left, sometimes increased by pressure over the ribs covering the spleen; by the accompanying cyanosis and the sudden and complete collapse. It is well to bear in mind that the same symptoms may be due to a perforative peritonitis from perforation of the gall-bladder following a cholecystitis. Here, however, the symptoms would be first referred to the right hypochondrium.

A suppurative pancreatitis, while usually the result of an acute hemorrhagic inflammation of the pancreas, may occasionally develop slowly and give the picture of an obstruction of the choledochus either by a stone or by pressure from without. It may be accompanied by chills, epigastric tenderness and rigidity of the abdominal muscles without a tumor being palpable. Here the presence of free fat in the stools and perhaps a glycosuria would render a diagnosis possible.

Chronic intestinal pancreatitis sometimes results from gall-stone disease. It is strongly to be suspected (an absolute diagnosis is rarely possible) if glycosuria supervene after a history of gall-stone colic, jaundice of persistent and varying type without palpable gall-bladder and accompanied by chills and fever; in other words, by the symptoms showing a calculous obstruction of the lowest part of the choledochus.

If Opie's recent find of a fat-splitting ferment in the urine of a case of acute pancreatitis mentioned by Thayer in an article in a recent issue of *American Medicine* be confirmed by its presence in the urine in other cases, a valuable differential clinical sign will have been established.

Carcinoma of the head of the pancreas, the usual site of carcinomatosis of this organ, may well be confounded with choledochus obstruction due to stone. The absence of a history of colic, the ever-increasing intensity of the jaundice, the persistent increasing pain in the epigastrium as opposed to the paroxysmal pains of gall-stone, the presence of a hard tumor in the epigastrium and of a distended gall-bladder, the presence of free fat in the stools and of a glycosuria, the wasting and the cachexia would favor the diagnosis of cancer of the pancreas.

Hydrops of the gall-bladder may be mistaken for fluid tumors of the kidney or for ovarian cysts. While hydrops cystidis felleæ may develop without marked signs such as pain, tenderness, and jaundice, it is readily recognized by a palpable tumor which may be freely movable in a circular manner from a fixed upper center, the neck of the gall-bladder. The tumor itself begins at the edge of the liver and does not extend over the liver surface; it descends and ascends with respiration and by these signs differentiates itself from the tumors of the kidney and ovary.

Signs of chronic choledochus obstruction may arise from the impaction in the duct of parasites such as round worms, distoma hepaticum, etc., conditions so rare that they require only passing mention as possible causes of the existing conditions under discussion.

Carcinoma of the Biliary Passages.—While the diagnosis of cancer of the gall-bladder in most of the cases is not easy, its distinguishing signs being a hard, nodular, painful tumor of the gall-bladder of rapid growth, with developing icterus and cachexia and later with the involvement of the liver and glands at the portal fissure, and the appearance of ascites, the diagnosis of carcinoma of the ductus choledochus is most difficult and uncertain. Here we have all the signs of a chronic obstruction of the choledochus which obtains either from an obturating stone or from a tumor of neighboring organs. It is only by the process of exclusion that we may hope to differentiate.

Infectious Icterus.—To this class belongs the systemic invasion of the bacillus proteus fluorescens and bacillus pyocyaneus and includes yellow fever, relapsing fever, and pneumonia. The first, known as Weil's disease, is differentiated from disease of the biliary organs by the acute abrupt onset with chill, intestinal disturbance, early jaundice, albumin and casts in the urine, sometimes hematuria and continuous high fever. The signs of sepsis with enlarged softened liver and spleen are early apparent. Often petechiæ are found scattered over the body surface. In suspicious cases blood-cultures should be made with the possibility of finding the infecting organism.

EMPYEMA OF THE GALL-BLADDER.[1]

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EMPYEMA of the gall-bladder may be briefly defined as that form of infective cholecystitis, acute or chronic, which is characterized by the presence of pus in the cavity and by various changes in the walls and peritoneal covering of the organ. Something more than the mechanical irritation of a stone in the cystic duct must be called upon to explain these severe forms of cholecystitis, and this is to be found in the infection caused by the multiplication of germs, derived most often from the cavity of the adjoining intestine. Although Riedel holds that in the majority of cases, the inflammation is due solely to the foreign body, this view is not held by Naunyn, Kehr and many other distinguished authorities, and is in distinct opposition to the findings in most of the animal experiments recently made to determine this and other points in question. It is reasonable to believe, then, that the degree and character of the infection are determined by the number, virulence, and

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character of the invading germs; and that the character and extent of the resulting cholecystitis, whether it be acute or chronic, seropurulent, purulent, or gangrenous, depend upon these factors, taking into consideration, of course, the individual and local resistance in each case, and the modifications produced by previous attacks of inflammation.

As Kehr very graphically puts it, "The inflammation often resembles a straw fire which only a moment bursts forth and quickly burns out, before the patient notices anything of it. But frequently it spreads like a conflagration in the neighborhood of its original site, seizing upon the peritoneum, the liver, the pancreas, and does not spare sometimes even widely-distant points as the heart, the lungs, the brain, and the kidney."

The different degrees of inflammation in cholecystitis, show themselves most clearly in the condition of the mucosa of the gall-bladder, which may be slightly swollen or noticeably thickened, marked here and there with points of decubital ulceration, or covered with a diphtheritic membrane, or totally gangrenous. As a result of these ulcerations, strictures and perforations may occur, and fistulæ, hemorrhages, and duct obliteration may naturally ensue. When the cystic duct remains completely obstructed the gall-bladder, excluded from the biliary system, becomes a cyst with serous or purulent contents—chronic hydrops, serous or purulent. The inflammation generally extends from the mucosa to the walls of the gall-bladder and causes marked thickening and edema of the serous and muscular layers, local peritonitis, purulent pericholecystitis, and leads to the formation of adhesions with the omentum and the neighboring viscera. It must of course be remembered that perforation is by no means necessary for the development of these conditions, and that local peritonitis in acute seropurulent cholecystitis, develops frequently by infection through the inflamed but intact wall of the gall-bladder.

From the experiments of Ehret and Stolz, it would appear that in certain animals at least the normal bile possesses to a high degree the important property of overcoming rapidly a not too virulent infection of the gall-bladder, if the outflow of the bile through the ducts remain unrestricted. If, then, we accept this and the theory that the degree of inflammation depends upon the degree and character of the infection, other things being equal, we can readily accept the dictum of Kehr that certain cases of acute cholecystitis may be followed by a complete *restitutio ad integrum*, if the cystic duct remains patent.

Although in most cases of purulent cholecystitis the infecting agent is derived directly from the intestine via the common bile-duct, it is highly probable, and indeed experimentally proven, that in some cases the infection is derived from the blood-stream, *i. e.*, hematogenous. Bile taken from fresh cases of acute cholecystitis almost always contains micro-organisms, whereas that obtained from old cases is not infrequently sterile, a fact explained by the early death of the bacteria as a result of the inflammation initiated by them. Naunyn states that the bacterium coli as a rule very quickly succumbs and that the cholecystitis and cholangitis set up by this organism do not generally become purulent unless an added infection with staphylo- or streptococci occurs. He believes, moreover, that the two forms of infection may often be differentiated, and urges upon physicians the importance of doing so; although he admits that in some cases of coli infection the local and general symptoms are very severe and not perhaps easily to be distinguished.

When infection of the gall-bladder takes place in a case of cholelithiasis, the mucosa swells, the cystic duct becomes obstructed and the organ becomes more or less widely distended with an exudate; this in turn gives rise to the pain, the tenderness, and the appearance frequently, of a palpable tumor which are characteristic. Up to a certain point these attacks of cholecystitis may be regarded as conservative, and in some cases actually curative, in that they may aid in the expulsion of the stones and lead to a natural cure. Unfortunately, these attacks are most often ineffective as regards expulsion and become often more frequently recurrent; or in other instances lead only to the extrusion of a large stone from the cystic duct, which becomes later impacted in the choledochus. In the recession of a mild attack of inflammation in the gall-bladder the swelling subsides, the transudate is discharged through the cystic duct and the normal circulation of the bile is reëstablished. In the severer forms, as of empyema and the phlegmonous inflammation, ineffaceable traces are left behind in the walls, the ducts and the overlying peritoneum.

Kehr, from an enormous operative experience in the field of gall-stone surgery, has arranged the cases of purulent cholecystitis in the following groups, as an aid to diagnosis, and based upon observed anatomical conditions.

1. Acute cholecystitis in a relatively healthy gall-bladder. In this form there is usually a a large stone in the vesical neck. The walls of bladder are thickened and the exudate therein is muddy or purulent.

2. Acute cholecystitis in an already contracted gall-bladder, which has been frequently the seat of inflammatory attacks. In this class, the cystic duct is generally obliterated, there are numerous adhesions, and the exudate is generally small in amount and slimy or purulent in character.

3. Empyema of the gall-bladder. Stone in the cystic duct. Pus in the bladder cavity. Adhesions. These cases are either the result of an acute serous cystitis or are from the first acute empyemas.

The cases of the first group represent the cases of acute seropurulent cholecystitis which are often seen, and which give rise to a well-marked acute cholecystitis and fairly characteristic ob-

jective signs. There is generally a palpable tender tumor to be felt below the right costal arch at the normal site of the gall-bladder. Jaundice is rare. Severe pain in the epigastrium, often extending through to the back, may be complained of. Marked sensitiveness to pressure over a considerable area is generally present. The general condition varies with the severity of the case and may be from fairly good to extremely bad. The hyperacute cases may show signs of cholangitis. There is often a circumscribed peritonitis, *i. e.*, pericholecystitis. Fever in these acute cases is generally present, but may be wanting. No increase in the size of the liver unless cholangitis be present. Generally in these cases there is no expulsion of stone. If, however, the attack of cholecystitis end with the passage of the stone, acute choledochus obstruction generally arises. Diagnosis in this class is generally easy. Confusion with appendicitis is possible, but may generally be avoided by careful attention to the form, mobility, tension and situation of the tumor, etc.

In the second group the tumor is often not palpable on account of its situation, high up beneath the liver. The pains are about the same as in group 1. The symptoms frequently change. Jaundice is rare, and if present is inflammatory rather than obstructive. The stones are not generally expelled. The diagnosis in this group is more difficult, on account of the absence of data from palpation. Exact attention to the history is the best guide to diagnosis. In cases of this type without feelable tumor, where general infection is severe and colic but slightly pronounced, a diagnosis of typhoid malaria or sepsis may easily be made.

In the cases of the third group the symptoms in the beginning are the same as in group one. Later the fever may be wanting. The other symptoms are sometimes entirely wanting, except for the presence of the characteristic tumor, or, more often, there are the pains in the region of the stomach. There is no jaundice, no expulsion of stone. The tumor is generally smaller than in simple chronic hydrops serosa. Diagnosis is generally easy. The tumor is movable if not too adherent and is generally tender on pressure. If perforation occur, the symptoms of a perforative peritonitis are added. In the beginning the tumor formed by an empyematous gall-bladder is very painful and tender. Later, however, this tenderness may become less, or, in some cases, may nearly or quite disappear.

Treatment.—In all cases of acute suppurative cholecystitis, as well as in the chronic empyemas, surgical treatment is clearly indicated, and in many instances imperative. An examination of the conditions found in these cases of severe gall-bladder inflammation should convince us of the dangers of repeated attacks and the futility of medical treatment, except in so far as it is palliative.

In the *first* group cholocystotomy with more or less prolonged drainage has generally proved effectual and is the measure clearly indicated. Early operation should be done to save unnecesary damage to the adjacent peritoneum by the spread of inflammation.

In the *second* group the indications for operation are none the less clear, though oftener longer delayed, perhaps, on account of the difficulty of early diagnosis in the absence of a tender and palpable tumor. Here cholecystostomy is again the operation to be employed in most of the cases, although cystectomy is undoubtedly proper in carefully-selected ones.

In the *third* group, the more or less chronic empyemas, incision and drainage is clearly indicated, but, as Kehr has shown, it may in some cases be necessary to do a cystectomy in addition, as when the stone is too firmly impacted in the cysticus to make possible its removal through expression into the gall-bladder. In selected cases a cystectomy, as recommended by Kehr, is undoubtedly a rational procedure.

As it has been abundantly demonstrated that all the severer forms of cholecystitis, as embraced under the subject of this paper, are serious and often dangerous affections, the unwisdom of delay and the ineffectiveness of purely medical treatment ought to be clearly understood. These cases ought to be recognized by the attending physician perhaps more commonly and promptly than is generally the case. All surgeons who are called upon to operate in these delayed cases will recognize very clearly the force of this statement.

Early cholecystostomy, when the disease is limited largely to the gall-bladder, is a safe, rational and effective procedure; and one which has the confidence of surgeons here as well as abroad. It is based upon sound principles, and achieves very definite and satisfactory results. Delay in operation, on the other hand, may mean more frequently recurring attacks of inflammation, more adhesions, involvements of neighboring viscera more or less serious, and finally an operation which is often dangerous, always difficult, and frequently ineffectual.

THE SURGERY OF GALL-STONES.*

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ALTHOUGH my contribution to this subject must necessarily be confined to the treatment of gall-stones, I cannot help alluding to the enlargement of the field of biliary surgery to include to a great extent the surgery of the pancreas, through the demonstration by Mayo Robson of the causative influence of gall-stones and diseases of the biliary passages in the production of pancreatitis. Also chronic appendicitis seems to be frequently associated with gall-stones, the assumption being that it is probably causative by infection of the biliary passages through the portal circulation. Ochsner,[1] in eighteen cases of gall-stones operated upon by him in the early

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part of last year, found the appendix diseased in six, *i. e.*, 33 per cent. He therefore concludes that the appendix should be examined, when feasible, during operations for gall-stones.

In regard to the surgical treatment of gall-stones I cannot help feeling that much missionary work is necessary in order that earlier diagnosis may be made and that cases may be subjected to interference before complications have arisen. One cannot but be struck by the severity of the conditions present in cases coming to operation in this city. I reiterate "in this city," for apparently fewer cases are operated upon in this city than in other cities of this country, and consequently the conditions found in the cases are more advanced and serious.

For illustration I shall briefly cite the conditions present in the cases operated upon by me during the past eighteen months at Roosevelt and St. Luke's Hospitals. These are eleven in number and, I think, are fair examples of cases ordinarily found in the surgical wards of the hospitals of this city.

Case I.—Cholecystitis. Small contracted gall-bladder filled with calculi. Difficult operation. Cholecystostomy. Recovery.

Case II.—Cholecystitis. Gall-bladder extending 9 cm. below liver, containing large quantity of calculi from 2 mm. to 2 cm. in diameter and a large quantity of mucoid fluid not bile-stained. Impacted stone in cystic duct. Adhesions to duodenum. Cholecystectomy without opening gall-bladder. Closure of abdomen without drainage. Rapid, uneventful convalescence.

Case III.—Suppurative cholecystitis. Abscess of liver. The gall-bladder contained twelve calculi of moderate size and had ruptured into liver substance, the abscess pointing at the upper surface of the liver. Removal of calculi through incision of liver abscess. Drainage. Cure for eight months, then returned with empyema of the gall-bladder pointing in upper part of scar. Two stones were found impacted in the cystic duct and removed, having escaped observation in the operation eight months previously; one was 1x2 cm. the other 6 mm. in diameter. Recovery.

Case IV.—Suppurative cholecystitis. Gall-bladder 18 by 9 cm., entirely surrounded by adherent omentum, contained about a liter of pus and numerous seed-like calculi. Cholecystostomy. Recovery.

Case V.—Stone in common duct. Gall-bladder much contracted, empty. Numerous adhesions. Movable stone in enlarged common duct, 1x2 cm. in diameter, choledochotomy, suture of duct. Healing without leakage. Discharged cured on twenty-third day.

Case VI.—Cholecystitis and stone in common duct. Gall-bladder contracted to hard mass, 8 cm., from free border of liver and embedded in dense cicatricial tissue and could not be identified until excised. It contained about 50 small calculi. A small stone which was in the common duct was pushed into duodenum by a probe passed through the divided cystic duct. Operation exceedingly tedious and difficult. Free discharge of bile for three days; healing except for small sinus in nine days. Recovery.

Case VII.—Cholecystitis. Gall-bladder contracted; 7 cm. from free border; contained six stones about a cm. in diameter. Cholecystostomy. Recovery.

Case VIII.—Suppurative cholecystitis. Gall-bladder 18x6 cm., much thickened, contents pus and calculi; 29 calculi were removed, 3 of which were a centimeter in diameter; the last removed from deep in cystic duct was followed by a gush of bile. Cholecystostomy. Recovery.

A month later, the sinus refusing to heal, a stone was discovered with probe deep in cystic duct, as it could not be removed through the sinus, the abdomen was opened at the inner side of the scar the gall-bladder was found contracted and a round stone 2 cm. in diameter was removed by incising cystic duct. Recovery.

Case IX.—Cholecystitis; cholangitis; adhesion to duodenum of gall-bladder; gall-bladder contained two calculi, one result of old perforation into duodenum; stricture of duodenum; cicatricial or inflammatory obstruction of common duct; deep jaundice. The gall-bladder was small and contracted and its wall seemed to form part of the duodenum, which was opened in separating it. The gall-bladder ducts and the duodenum were matted together with adhesions. The common duct contained tarry bile but no palpable calculus. The stricture in the duodenum just admitted the tip of the index. Duodenoplasty. Cholecystostomy. Free discharge of bile. Death on sixth day from sepsis and exhaustion.

Case X.—Rupture of gall-bladder. In this case the gall-bladder had been ruptured a week and a cystic collection of thin bile had formed on the right side reaching down below the pelvic brim and had been walled in with thin adhesions. On the day of admission these had ruptured causing a general abdominal extension, which was followed by a chill and rise of temperature. The fluid in the abdomen was clear and of a pale yellow color, there was a moderate fibrinous peritonitis walling in the primary collection. There was a ragged aperture 5 mm. in diameter in the fundus of the gall-bladder which contained small faceted stone and one 2.5 cm. in diameter. It did not appear inflamed. Cholecystostomy. Abdominal lavage and drainage. Death on fourth day from peritonitis.

Case XI.—Cholecystitis. Gall-bladder embedded in the liver, only one-third of its periphery apparent. Wall thickened. Size 10x5 cm. A stone could be felt in a dilatation of the cystic duct. Cholecystectomy. Recovery.

Case XII.—Obstructive jaundice, probably due to a new growth in the head of pancreas which was very hard and nodular. The patient was almost *in extremis* and a cholecystostomy was followed by death in twelve hours.

A thirteenth case was recently operated upon by Dr. W. T. Bull and myself. The gall-bladder

was normal in size and its walls were moderately thickened. It was surrounded by moderate adhesions and contained a stone 2x1.5 cm. besides some pasty material. The common duct contained an irregular soft calculus at least 3 cm. in diameter and a quantity of smaller soft concretions above the main calculus. The calculus was movable and there was subsiding jaundice. Choledochotomy with suture of the duct and cholecystostomy.*

In five of these cases the gall-bladder was much contracted, thickened and adherent, and difficult to drain or remove. Three were advanced cases of common duct calculus. Three had empyema of the gall-bladder, and in two of these complete operation could not be carried out, secondary operation becoming necessary. One had a much distended gall-bladder without marked adhesions, which was easily removed. In one the distended and thinned out gall-bladder had ruptured causing a local and finally a spreading peritonitis. In one a stone had evidently at some previous time ulcerated through the wall of the gall-bladder into the duodenum causing a stricture of the latter and finally an obstruction of the common duct had resulted from contraction, causing advanced cholangitis and cholemia. One, although not a case of cholelithiasis, had had obstructive jaundice for four months and had reached a condition in which treatment was unavailing. An autopsy in this case might have recealed a chronic pancreatitis which could have been relieved if proper treatment had been instituted earlier.

In all these cases there had been a history of repeated attacks with the exception of one case of suppurative cholecystitis in which there had been only one attack four months previously. The history in most of them had extended from one to four years. The fatal cases were both elderly, fat women; in one a peritonitis was already present and in the other advanced jaundice and cholangitis.

The mortality of complicated cases is necessarily high, while that of early and uncomplicated cases is low. In regard to this point Kehr's statistics are of interest. Kehr[2] up to November, 1900, had performed 547 operations for gall-stones; of these 125 were complicated by either peritonitis, purulent cholangitis, cirrhosis of the liver or carcinoma of the liver, pancreas or ducts, and the mortality was 47 per cent. Of the uncomplicated cases there were 204 cholecystostomies or cholecystendyses with four deaths, 2 per cent.; 121 cholecystectomies with four deaths, 3.3 per cent., and 97 choledochotomies with six deaths, 6 per cent.

Riedel[3] reports 100 cases of cholecystostomy and cholecystectomy with two deaths, both cholecystectomies. Loebker,[4] thirty-seven cholecystostomies with no deaths and eighty-seven cholecystectomies with only two deaths. These statistics show a very low mortality and the cases must have been favorable. They are quoted simply to show that in good hands and in favorable cases the mortality of gall-stone operations is not high. Present statistics, however, are not particularly valuable inasmuch as the cases are not properly classified.

Stones in the common duct may be considered as unfavorable cases, the mortality ranging from 6 to 20 per cent. with different operators.

The moral is to operate early while they are still in the gall-bladder. Biliary colic in the majority of cases is due to cholecystitis and operation should be done as soon as a diagnosis of cholecystitis is made. As McCosh[5] says, an early exploratory operation is better than to contend with the dangers of cholemia.

Maurice Richardson[6] claims that early operations are unattended by mortality.

The status of gall-stone surgery to-day resembles in many ways that of appendicitis ten years ago. There is the same delay in diagnosis, and the same hesitancy in treatment. With earlier diagnosis and treatment the medical profession and the public will, I am sure, acquire the confidence in the surgical treatment of gall-stones that they now have in that of appendicitis; and, as in appendicitis, more interval operations will be done.

There is another point in the surgery of gall-stones that I wish to bring before you, namely, Shall we resort to cholecystectomy in many cases now treated by cholecystostomy? Cholecystectomy first came into favor in France and has lately been performed more and more frequently by German and American surgeons. For instance Kehr, in his later operations, does cholecystectomy unless drainage is indicated. In this country Gibson and Mayo were among the first to promote the operation and it is now performed regularly by a number of operators. There are several conditions in which cholecystectomy is indicated as the operation of choice, and these are (1) gangrene of the gall-bladder and suppurative inflammations endangering its vitality; (2) neoplasms of the gall-bladder; (3) injuries of the gall-bladder, and (4) permanent obstruction of the cystic duct. In the following conditions it is not so imperatively indicated: (*a*) contracted gall-bladder which cannot be attached to the parietal peritoneum for drainage, and (*b*) calculi impacted in the cystic duct which cannot be removed except by incising the duct.

Cholecystectomy should not be performed in cases in which drainage is indicated, namely, (1) when there is uncertainty as to the patency of the common duct; (2) suppurative cholecystitis without sloughing; (3) cholangitis; (4) when the duct is sutured after choledochotomy and the gall-bladder can be easily and safely drained; (5) it should not be attempted in cases in which prolongation of the operation would lessen the patient's chances, as when jaundice and bleeding are present or there is impairment of vitality by disease, age or condition.

*This patient has since recoved.

Eliminating these cases in which cholecystectomy is indicated or contraindicated, we have left a class of cases which are mostly interval cases and of which the following case lately observed in the service of a colleague at Roosevelt Hospital is a good example. The patient, a woman twenty-five years of age, was admitted in the latter part of December, 1901. Seven years before she had had a severe attack of intermittent pain without jaundice lasting off and on for two months. In the following six months she had several mild attacks. Her next was three years later when she had an attack of very severe pain lasting for two hours and accompanied by collapse, nausea and vomiting. She was then well until April, 1900, when a series of attacks of pain commenced with more or less continued jaundice lasting until April, 1901. In December, 1900, she found four small calculi in the stools. The pain ceased in April, 1901, but slight jaundice continued till December, 1901, when after severe pain and increased jaundice lasting for two weeks, she passed, on December 18, an irregular stone the size of a pea and her pain and jaundice disappeared. Operation on January 2, 1902, revealed a somewhat enlarged but practically normal gall-bladder with no adhesions, containing bile and six calculi ranging from 4 to 8 mm. in diameter. There were no calculi in the ducts. Bacteriological examination of the bile from the gall-bladder revealed the colon bacillus. In such a case which operation should be done, cholecystostomy or cholecystectomy?

In deciding this question let us consider some of the advantages that cholecystectomy offers as compared with cholecystostomy. These are (1) a radical cure of the cholecystitis and gall-stones by the removal of the nidus of infection and calculi. (Kehr reports recurrence of pain in 6 per cent. of cases treated by cholecystostomy); (2) avoidance of biliary fistula; (3) a perfectly clean operation with no soiling by infected bile; and (4) avoidance of adhesions. As an objection to cholecystectomy, its greater mortality, as shown by statistics, at once presents itself. In considering this the fact must be taken into account that cholecystectomy had been chiefly performed for serious conditions such as gangrene, maligant disease and contracted gall-bladders buried in adhesions. Cholecystectomy in favorable cases such as the one just presented is an easy and rapid operation, and, I think, a safer operation than cholecystostomy with its attendant dangers of infection. In one of my cases (Case II.), although the bladder was distended so that it reached 9 cm. below the free border of the liver and a large calculus was impacted in the cystic duct, it was removed entire with great ease and rapidity. The duct was divided between ligatures without a drop of fluid being spilled, the mucous membrane of the stump was destroyed with the cautery, the peritoneum sutured over it and the abdomen closed without drainage.

The only question to my mind is as to whether the gall-bladder serves any purpose in our vital economy; if not, why should we hesitate any more to remove it in proper cases than we do the appendix?

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LITERATURE.

[1] Phila. Med. Jour., 1900, p. 652.
[2] Gall-stone Diseases, 1901 (Translated by W. W. Seymour).
[3] Quoted from Keefe, Boston Med. and Surg. Jour., Vol. CXLVI., p. 157.
[4] Münch. med. Woch., 1898, p. 40.
[5] Jour. Amer. Med. Assoc., 1899, p. 697.
[6] Quoted from Deaver, Annals of Surgery, Vol. XXXIV., p. 165.

MEDICAL PROGRESS.

PATHOLOGY.

The Bladder in Spinal Diseases.—In a contribution to the pathology of the urinary bladder in tabes and other spinal-cord diseases, W. HIRT (Ctblt. Krankh. d. Harn.- und Sex.-org., Mch. 22, 1902) calls attention to the fact that the histories of many cases record a hypertrophy of the vesical muscles. The author believes that there is either a functional hypertrophy of the detrusor muscle, or that the bladder-wall has become thickened by connective tissue hyperplasia due to a chronic cystitis. In a number of persons who as the result of a spinal paralysis are subject to disturbances of micturition, usually termed bladder paralysis, there is found at autopsy a true hypertrophy of the detrusor musculature, without any mechanical obstruction to the flow being present. The reason for this hypertrophy has long been a matter for dispute, as comparatively little is known of the dependence of the bladder function on the nerve centers. The most common belief is that if retention come on in the course of a spinal disease, it is a result of detrusor paralysis; if incontinence be present it is due to sphincter weakness or to paralysis. The internal sphincter can be voluntarily relaxed, but the action of the detrusor is purely reflex and involuntary. The author believes that detrusor paralysis can only be regarded as the condition in which the reflex motility of the muscle has entirely disappeared. If a muscle be no longer motile, how is its hypertrophy to be accounted for? It seems that the detrusor hypertrophy is functional, yet this is inconsistent with the idea of a paralysis. It is difficult to define the conception of sphincter paralysis, as the sphincter possesses two kinds of motility, reflex contractility and voluntary relaxation; "paralysis" must be limited to an abeyance of the former, "spasm" to a lack of the latter. This would necessitate a revision of the conception of sphincter paralysis in certain cases of spinal disease. The writer concludes that there are some patients in whom symptoms of a bladder paralysis existed during life (*i. e.*, retention and incontinence), but in reality neither detrusor nor sphincter was affected. In explanation of the considerable bladder disturbance which occurs in many cases of spinal disease, the author divides the latter into two classes, those which come on suddenly and those which develop slowly. If a sudden disturbance take place, as with a trauma, the bladder is suddenly surprised and the detrusor of course has no opportunity to hypertrophy before the next filling of the bladder. The muscle contracts in the usual manner, but is unable to overcome the sphincter, as this can no longer be voluntarily relaxed, either because the sense of a filled bladder cannot be communicated to the brain or because the motor paths containing the specific nerve fibers of the sphincter are destroyed. Retention then results. If the bladder be not regularly emptied, the non-compressible fluid contents prevent contraction of the detrusor, it stretches and secondary atrophy and paralysis quickly supervene. If catheterization be regularly done, this may be obviated. The detrusor contracts

oftener, longer and more energetically than in the normal condition, for catheterization is not done so often as the act of ordinary urination. In this way the detrusor dilates, but does not hypertrophy. In a few weeks it can often overcome the sphincter or reflexly cause its relaxation. The second category of cases includes those in which the nerve centers are gradually destroyed by degenerative processes, as in tabes. As the ataxia of striped muscle in tabes is considered due to disturbed centripetal influences, it may be possible to assign a similar agency to the disturbed bladder function. In reply to the idea that smooth muscles possess coördinating paths, the author states that the characteristic of coördinated movements is that they are not congenital, but acquired. Normal urination is therefore like standing and walking, the result of training. And, moreover, just as beginning disturbances of coördination in striped muscle can be overcome by concentrated attention by the patient on the muscular act (as in the glances downward by the ataxic in walking), so one may assume something similar for the bladder muscles. The involuntary micturition first taking place during sleep can thus be explained. By this disease of the centripetal coördination fibers in some ataxics the innervation is so disturbed that the internal sphincter does not open at the moment when the detrusor contraction has reached its normal height. The detrusor then overexerts itself, becomes hypertrophied and dilated; but, as these disturbances are gradually developed, it can still accomplish its function. If a functional hypertrophy of the detrusor be reached and there be an increasing amount of residual urine, the detrusor can often, by a very energetic contraction, suddenly overcome the sphincter and involuntary urination results. With this disturbance of harmonious action, the sphincter may close before all the urine is voided, or the detrusor does not contract at the moment or not strongly enough, when the sphincter is opened, so that micturition is often incomplete. In summing up the bladder disturbance of certain cases of spinal-cord disease, it appears that they occur mostly in disease of the posterior columns (*i. e.*, tabes and the closely-related paralyses) and in transverse myelitis when the posterior columns are involved.

Sarcoma of the Vagina.—W. ROGER WILLIAMS (Jour. of Obst. and Gyn. Brit. Empire, Apr., 1902) cites but two cases of sarcoma of this region out of a series of 2,648 consecutive cases of tumors in women, which would show that the condition is one of comparative rarity. A special feature of the malady in this locality is the large number of cases which originate in infancy, many of them being congenital. It is also met with in adults, but less frequently. Gatti tabulated 27 primary sarcomata of the vagina, 17 of which were in infants. These tumors often contain various unusual structures, to wit, striped muscle elements, islets of epithelium, leiomatous tissue, and telangiectatic blood-vessels, and they are relatively often congenital. Growths of this kind are commonest in early infancy, very few being met with after the fifth year. Although the disease is first noticed at birth in only a comparatively small proportion of the total cases, it seems probable that most of these early-life vaginal sarcomata are of congenital origin. The only operative treatment of any avail is total extirpation of the vagina, together with uterus and adnexa, by abdominal section. Several instances of congenital and early-life polypoid formations in the vagina have been met with, and these are often erroneously referred to as examples of congenital "myoma." The adult type presents the same general features as in other hollow organs, such as the uterus. Mucosal and parietal varieties may be recognized, according to the seat of origin of the primary tumor. The former is much the rarer. It presents a mass of soft, bossed-out growths, projecting from the infiltrated mucosa; or is a solitary circumscribed tumor, which may be pedunculated or sessile. In the practical variety a well-defined, firm tumor, varying in size from a walnut to an apple, is usually met with; but exceptionally the disease presents a dense, nodular infiltration. Mucosa sarcomata are generally soft and vascular, small, round and spindle cells predominating in their structure, which often comprises considerable myxomatous areas. Severe hemorrhages are common with this type of the disease. The parietal tumors are generally mixed celled fibrosarcomata, in which spindle cells predominate. It seems probable that some sarcomata of this kind may originate from vaginal "fibroids." The great majority of these sarcomata in adults originate from the lower part of the vagina, not far from the introitus. Quite as many originate anteriorly as posteriorly. The disease seldom spreads to the uterus; but the pelvic and inguinal lymph-glands may be involved. Recurrence is generally rapid after local ablation; hence early radical removal of the whole diseased area is the treatment indicated. When the disease is limited to the lower part of the vagina, vaginal extirpation by transverse perineotomy may suffice (Olshausen). Sarcomatous disease may be secondary to disease elsewhere, *e. g.*, uterus, vulva, etc. Mucosal uterine sarcomata and deciduoma malignum (syncytioma) are specially prone to disseminate in the vagina.

Bacilli Coli Communis.—An extended review of the literature as to the part which this bacillus plays in human infection and accounts of his own observations led A. J. LARTIGAU (Jour. Amer. Med. Assoc., Apr. 12, 1902) to submit the following conclusions: (1) The bacilli coli communis is widely distributed in the normal body and in nature; it is present as a saprophyte in the alimentary canal, in the common bile-duct, on the skin near the mouth and anus, in the anterior portion of urethra and vagina. (2) It may, under what seem normal conditions, be carried during life from the intestine to healthy normal viscera, more especially to the liver and kidneys through the portal circulation. Similarly it may reach the systemic circulation. (3) Agonal and postmortem invasion of the tissues is common, with or without apparent lesion of the mucous membrane of the intestine. (4) The virulence of the bacillus is influenced by changes in the physiological activities of the intestine and growth in new-host environment. (5) The rôle of this organism as a primary inciting factor in infection is infrequent. It claims attention as a secondary invader of tissues previously occupied by other micro-organisms. (6) The bacillus may induce inflammatory lesions, mainly suppurative, in the body tissues generally; the infection may originate in the intestine. (7) Its rôle in acute inflammatory lesions, especially of the appendix, peritoneum, and urinary passages, has been overestimated. It commonly acts as an accessory factor. (8) It is a factor of importance in the incitement of cholelithiasis.

Pathogenesis of Balantidium Coli.—The Balantidium coli, which was discovered by Malmsten in 1857, is an infusorium of the order Heterotricha. A normal inhabitant of the large intestine of swine, it is also occasionally found in the human being, but only when associated with dysentery, diarrhea or other intestinal disease. It probably enters the human body by infection from its normal host, the pig. Mitter has collected from the literature a series of 28 cases, 9 of which were reported by Scandinavian writers. HARLOW BROOKS (N. Y. Univ. Bull. of Med. Sc., Jan., 1902) has made a large series of examinations of the dejections of Bellevue Hospital patients without once discovering the organism. It is probable on account of its origin that

it could be more easily found in country districts. Strong of Manila found that this parasite plays an important rôle in the causation of the tropical dysenteries prevalent in the Philippines. Inasmuch as the parasite has never been described associated with intestinal disease in any other animal than man, Brooks believes it worth while to report an epidemic of dysentery caused by the Balantidium and occurring among the apes of the New York Zoölogical Park. Autopsy in a fatal case showed an ulcerative colitis with resulting anemia and localized peritonitis. Myriads of the Balantidium coli were present in the mucoid material covering the mucosa of the colon. A careful search was made for ameba coli, but none were found. Brooks disagrees with those writers who deny that the Balantidium coli is a pathogenetic agent. Since the chance of infection in cities is slight, one must look to country practitioners for further careful study of this parasite in its relation to ulcerative dysentery in man.

Contribution to the Study of the Bacillus of Syphilis.—A variety of observations on normal subjects and patients recently and remotely infected with syphilis lead M. Joseph and Plorkowski (Berl. klin. Woch., Mch. 31, 1902) to the conclusion that a specific bacillus is to be found in living spermatozoön of recently infected individuals. The bacilli in question could not be demonstrated in ejaculations containing no spermatozoa, nor were they to be found in the spermatozoa of normal individuals, nor in those subjects examined three, four and ten years after specific infection. Experiments in animals were unproductive; attempts were made to infect mice, guinea-pigs, puppies and swine, but no apparent influence of the subcutaneous and intraperitoneal injection of the cultures could be observed. The authors describe in detail the microscopical and cultural characteristics of their bacillus and promise a further report on the presence of the bacillus in hard chancres, mucous patches, condylomata lata, gummata, and in the blood of syphilitics.

Relation of Caseous Pneumonia to Miliary Tuberculosis.—A morphological distinction between caseous pneumonia and miliary pulmonary tuberculosis in the sense that the tubercle shows only interstitial, interalveolar proliferation analogous to granulation tissue, while the pneumonia is a manifestation of a superficial, intra-alveolar fibrinous and cellular exudation, is not granted by P. Baumgarten (Deutsch. Arch. f. klin. Med., Vol. 73). A careful examination of both types of pulmonary lesions caused by the tubercle bacillus shows that the difference is but a quantitative one and that both processes, to some degree, take place in each.

Cause of Nephritic Edema.—That the explanation of the edema of Bright's disease by changes in the vessel-walls with increased permeability for the serum is not sufficient for all cases is a well-known fact. A. Kast (Deutsch. Arch. f. klin. Med., Vol. 73) injected the sterile serum of healthy and of nephritic patients into dogs and measured the amount of lymph flowing out of the thoracic duct. In all of the latter cases there was an increased production of lymph, provided that the patient from whom the serum was taken suffered from subcutaneous edema. The explanation is that certain unknown substances form in the blood which are capable of stimulating the capillary endothelium or the cells engaged in elaborating the lymph.

Pathogenicity of the Bacillus Pyocyaneus.—That the bacillus pyocyaneus is not so harmless as was hitherto thought is again proven by the case reported by O. Soltmann (Deutsch. Arch. f. klin. Med., Vol. 73). In a thirteen-year-old boy who come to autopsy with the diagnosis of septic pneumonia, softened foci of cheesy consistence and yellowish-green color were found in the lung tissue. A bacteriological examination revealed the presence of the bacillus pyocyaneus in almost pure culture. The source of the infection could not be settled absolutely, but the fact that the patient was the son of a cab-driver and spent much of his time in stables makes it probable that the germs were inhaled.

Tetanus and Subcutaneous Injections of Gelatin.—The recent adaptation and application of gelatin by subcutaneous injections to various diseases of the blood mark what is probably a long step forward in medicine. Hochhalt and De Herczel (La Sem. Méd., Mch. 19, 1902) report an observation of a woman, afflicted with Banti's disease, on whom a splenectomy was done. The patient had previously had frequent hemorrhages, so that the operation was preceded and followed by subcutaneous injections of a boiled two-per-cent. solution of gelatin in water as a preventive. The immediate results of the operation were favorable, but on the seventh day the patient began to show peculiar sensations and irritation, which later in the day developed into the characteristic symptoms of tetanus. The attack was fatal notwithstanding an injection of antitetanic serum. This fact agree with the researches in the bacteriological laboratories of E. Levy, H. Bruns and Schmiedicke, namely, that the gelatin of commerce may contain the bacilli of tetanus. Moreover, L. Deusch examined the gelatin used by the two observers. In both cases, after it had been boiled for five minutes, colonies of opaque, anaerobic, sporiferous germs were found. His conclusion is that boiling for five minutes is not sufficient to sterilize the gelatin, and that boiling must be maintained for fifteen minutes in an autoclave at a temperature of 105 or 106° C. For still greater security he recommends adding before sterilization a small quantity of culture of the bacillus subtilis. Since this micro-organism is more resistant than that of tetanus, it will be possible to employ without fear any gelatin which after standing for two or three days produces no colonies whatever. Unfortunately, the mechanism of hemostatic action of gelatin is still far from being completely explained, and it cannot at this time be stated whether or not such action would be checked by subjecting it to prolonged heat at a temperature above 100° C.

Pathology of Shock.—It is generally conceded that the predominant factor in shock is a paresis of the circulatory system, especially of the heart and arteries, but the explanations of the clinical phenomena have never been satisfactory. E. Boise (N. Y. Med. Jour., Apr. 12, 1902) urges the belief that the essential condition in shock is a profound disturbance of the entire vasomotor and sympathetic systems, but that it is in the nature of a hyperirritation rather than a paresis. The disturbing influence may reach the centers either from direct irritation of the abdominal sympathetic system, by crushing injuries of the skeletal nerves, or from sudden fright. The clinical aspect of mental shock differs from that of traumatic shock only in point of duration. There are the same sudden pallor and clammy perspiration, the same abolition of the pulse to a greater or less degree, the same relaxation of sphincters and the sense of absolute physical prostration. The pallor of shock has been designated as livid, because the arteries and arterioles are comparatively empty, the veins remaining filled. This condition of arterial anemia cannot be explained by an arterial paresis. It is believed that stimulation of arterial vasoconstrictors coincides with a stimulation of venous vasodilators and *vice versa*. Thus, the clinical manifestations of shock would be easily explainable. The stumbling-block to the acceptance of this theory has always been the fact that arterial tension is extremely low in shock

and one always expects it to be high when the vaso-constrictors are stimulated. It has frequently been demonstrated, however, that when death occurs during shock the heart is frequently found in a state of tetanoid contraction, and during the rapid irregular contractions the left ventricle is not allowed to fill and hence the arteries are not distended. Experimentation has, furthermore, shown that severe stimulation of the cervical sympathetic causes cardiac spasm and low-tension pulse. The mental and physical prostration can also be explained by this arterial anemia. The symptom of profuse and clammy perspiration can be explained only by the theory of hyperirritation of the sympathetic system and especially of the secretory fibers. The diminished secretion of urine also depends upon the arterial pressure and supply of blood to the kidneys. The arterial anemia here again affords a rational explanation. Uncomplicated shock, therefore, is a hyperirritation of the entire sympathetic system resulting in a spasmodic condition of the heart and arteries. The chief remedies used are opium, strychnine, intravenous saline injection, and external heat. Amyl nitrite is suggested as a valuable drug in these cases to relax the spasmodic contraction, but it must be given in doses which would ordinarily prove toxic.

On the Classification of Pathogenic Streptococci.—The pathological importance of the streptococcus makes it a matter of great moment to determine the significance of the morphological differences displayed by streptococci in culture. Several years ago A. MARMOREK (Berl. klin. Woch., Apl. 7, 1902) showed that variations in the size of the individuals forming the chain or differences in the length of the chain could be easily modified by slight alterations in the composition of the culture-medium. This writer asserts that no matter what their morphological differences may be, all forms of pathogenic streptococci possess in common certain bio-chemic characteristics which place them in a single class. First in importance among these qualities are the ability to cause hemolysis in the blood of dogs and the inability of the streptococcus to grow in its own culture filtrate. In the course of his experiments Marmorek utilized streptococci of erysipelas, of puerperal fever, of scarlatinal angina, of pneumonia following measles, of phlegmon, as well as the streptococci found in mixed infections in cases of diphtheria, tuberculosis and influenza. The hemolytic power of the streptococcus of scarlatinal angina is apparently less than that possessed by specimens obtained in other forms of disease. Marmorek is convinced that antistreptococcus serum from a single source will successfully immunize against all forms of streptococcus; this conclusion is based upon experiments on animals. Thus there appears to be no scientific justification for the separation of supposed varieties of streptococci pathogenic in man. On the contrary the streptococci found in human beings are of a single family. Streptococci which for a long time have lived in association with other pathogenic bacteria may undergo morphological changes, but these are not sufficient to influence materially the essential characters or the physiological function of the bacteria in question.

Enzymes in Tetanus Cultures.—By means of a series of experiments M. COLLINA (Gazz. degli Osped., Mch. 30, 1902) believes he has demonstrated the presence in tetanus cultures of two ferments, one fluidizing, the other coagulating. Gelatin became fluid upon the addition of the culture filtrate; Wasserman's fluid (blood serum of horse, distilled water, neutral glycerin, sodic phosphate of casein) was first coagulated, then fluidized. Perhaps the most interesting outcome of these experiments was the partial neutralization of fluidizing and coagulating power through the addition of normal blood-serum to the culture filtrate prior to subjecting these substances to its action. The inhibitory influence of serum from animals vaccinated against tetanus was more marked and in direct proportion to the antitoxic power of the serum.

Cytology of Effusions.—A contribution to the subject of cytodiagnosis is made by BARJON and CADE (Gaz. Heb. de Méd. et de Chir., Mch. 30, 1902) in a paper giving conclusions drawn from 100 examinations of effusions from serous cavities. It was found that the pleural effusion alone presented definite characteristics which could be utilized for clinical purposes; effusions from other serous cavities differing one from the other, and not following any fixed rule. The experience of the authors coincides with that of Widal and Ravaut from which are drawn the three cytologic formulæ: (1) Preponderance of lymphocytes indicates tuberculous pleurisy; (2) of polynuclear cells, inflammatory pleurisy; (3) of endothelial cells, mechanical pleurisy; but marked variations in these formulæ were noted in the early stages of the disease. In a case of tuberculous pleurisy, which was aspirated upon the fifth day, endothelial cells were found, 60 in 100, suggesting mechanical pleurisy; yet inoculation of a guinea-pig with the fluid demonstrated its tuberculous nature. In another tuberculous case, aspirated upon the third day, there were polynuclear cells, 68 in 100, with absence of lymphocytes; aspiration six days later showing polynuclears, 1 in 100, lymphocytes, 58 in 100. Hence, it is seen that the cytologic formula varies with the age of the pleurisy. The authors believe, however, that definite characteristics are established by the third week, from which reliable diagnostic conclusions can generally be drawn.

OBSTETRICS AND GYNECOLOGY.

Prophylaxis in Gynecology.—Prevention in medicine is its highest sphere of usefulness. L. M. BOSSI (La Gyn., Feb. 15, 1902) enumerates the following points in the prevention of gynecological conditions. It is necessary for the profession to apply itself to the importance of teaching the laity the final necessity for care in obstetrical practice. It is necessary not only to save the mother and the child, but so to treat the mother that her genito-urinary organs shall escape unharmed and fit to renew their function. It is necessary for the profession at large to appreciate the justice of special knowledge in the lines of gynecology and obstetrics. Too many of the procedures, while easy, are grave in their possibilities and demand technical experience. The creation of societies devoted to the instruction of women in regard to various important matters concerning themselves would probably be a means of avoiding some of the causes of gynecological invalidism. Books and papers may be distributed, periodical conferences held with the sole purpose in view of teaching them some of the simple laws of health. Mothers must be taught the grave dangers which result to their daughters of infractions of the laws of hygiene, especially at the age of puberty; of irregularities, voluntarily produced, in menstruation, and of the improprieties of conjugal relations. It is probably only by these means that in time such a degree of knowledge will be reached as to decrease the unfortunate number of neurasthenics, neuropathics and similar wretched forms of nervous trouble among women.

Exploratory Vaginal Incision.—Surgery and gynecology have both given their warrant to an exploratory laparotomy when other means of diagnosis are no longer available and the condition of the patient makes it necessary for the attendant to know by direct vision what the pathological process is. The vaginal operation for exploration of the pelvic and abdominal cavities is,

however, in the transition stage, many favoring this, but perhaps a greater number preferring the other route for the purpose. G. SPINELLI (La Gyn., Feb. 15, 1902) states that at least for one condition no one can deny its justice and wisdom, namely, suspected ectopic gestation, especially when the symptoms point toward a rupture. He adds that by these means only can one be certain of the presence or absence of this fatal condition, evacuate at once a large hematocele, and check the hemorrhage which might go on to death. As a prophylactic measure against the results of incomplete tubal abortion and as a preventive against rupture at all it must necessarily occupy a high position in the opinions of those who desire to save the lives of their patients.

Myomotomy.—The difficulties which surround the matter of approach to myomata have long been recognized. W. THORN (Ctlblt. f. Gyn., Mch. 15, 1902) concludes as follows: The almost unending variety in which myomata of the uterus appear makes it necessary to individualize in almost every case. In addition to this factor is that which concerns the personal taste of each operator or his ability and experience in either of the two routes, namely, vaginal or abdominal. The vaginal operation has given such surprisingly good results that it should not be limited, but rather extended in its application. It should be employed whenever it is possible to do so.

Suppression of Urine After Labor.—Serious disturbances in the renal function have long been recognized as among the most dangerous complications of gestation, but the physiological merges so insensibly into the pathological that it is far from easy to determine the exact point at which the normal is transgressed and danger begins. R. G. MCKERRON (Jour. of Obstet. and Gyn. of the Brit. Empire, April, 1902) says that when the pathological conditions are brought on by pregnancy delivery usually brings about a normal condition, though in eclamptic cases death may ensue before the functional activity of the kidneys is restored. Complete suppression of urine during pregnancy has not been noted without eclampsia apart from surgical interference. It has followed ovariotomy during gestation (Bland-Sutton). Literature furnished only three instances of uncomplicated postpartum suppression of urine. The writer believes, however, that it is more common than this would lead one to suppose, he having had two cases of complete and one of partial anuria in his own experience during the last three years. In offering an explanation of the causation of this condition one is compelled to rely upon clinical records which are necessarily incomplete in respect to the condition of the kidneys which led up to it. The women are generally under thirty, and this fact may exclude Bright's disease. Two of the six patients were primiparæ; the other four had had evidences of renal inadequacy in their previous puerperal histories. In but one case did the gestation continue to term. In five of the cases the children were stillborn. Altogether the women were fourteen times pregnant, and four times only did pregnancy terminate in the birth of a living child. In four of the women labor was unusually rapid, if not precipitate. Slight accidental hemorrhage immediately preceded the onset of labor in two cases, in one of which it was accompanied by excruciating pain. Total suppression of urine existed in most of the cases for several days without any urgent symptoms. The most uniform and striking symptom was vomiting. The urine when present was of rather high specific gravity and contained albumin and blood. Bond holds that the suppression is due to impaction of calculi in both ureters. McCrae believed that the anuria was due to the absorption of decomposing matter in connection with the dead fetus in utero, which, it was thought, had given rise to blood-poisoning, a conclusion to which, he held, the symptoms strongly pointed. The author thinks that the fetal death and the postpartum anuria depend on a common cause and that this cause is to be found in the character of the labor. Fagge says that shock accompanying rupture of the uterus will produce a temporary anuria. If this be so, it is reasonable to suppose that the intense pains which occur in precipitate labor may produce a great deal of shock, which may be the sole factor in the production of the postpartum anuria. Thus from analysis of the clinical condition present, the following would seem to be the most important factors in the production of the condition. (1) A pathological condition in the kidneys—nephritis. (2) A neurotic temperament; the influence of this is seen in hysterical suppression. (3) The shock incident to an undue rapidity of labor, or arising from excessive pain. These seem in all cases to have been the inciting cause.

Cardiac Disease in Pregnancy and Parturition.—In pregnancy an extra amount of work has to be done by the heart to supply the wants of the uterus. If the heart be diseased in the non-pregnant, Nature tries to remedy the condition by a compensatory hypertrophy, but if the woman become pregnant the extra strain thrown on her circulation will be very liable to upset this arrangement. Something like fifty per cent. of these patients are said to die, but ROBERT JARDINE (Jour. of Obstet. and Gyn. Brit. Empire, Apr., 1902) says that this is too high. Pure mitral stenosis is said to be the most deadly of all lesions. The blood is dammed back into the lungs, which become engorged and edematous, and finally the right side of the heart becomes dilated. With the completion of labor the uterine vessels are engorged, and, if there has not been a large hemorrhage in third stage of labor, a large amount of blood must necessarily be returned to the right side of the heart, which may become engorged and paralyzed. Hart states that the hemorrhage relieves the right heart of the extra work, so that in these cases, if there be no hemorrhage and if the heart be embarrassed, phlebotomy should be performed to save the patient. Next in seriousness to mitral stenosis comes aortic incompetence. Mitral incompetence is not so serious unless very marked. Should a woman with heart disease marry? If the woman has suffered from failure of compensation at any time, no matter whether the lesion be mitral stenosis, aortic incompetence, or both combined, the answer should be decidedly negative. When labor begins, large doses of strophanthus or digitalis should be given. When the os is dilated labor should be terminated. The patient should not be allowed to bear down. During the third stage bleeding should be encouraged. Ergot is contraindicated. Stimulate the heart during the puerperium. Forbid nursing, for this has a bad effect on a damaged heart. The lymphocyte percentage usually exceeds that of the neutrophiles at birth. After the first feeding there is a relative and absolute increase of the neutrophiles (50 to 80 per cent). This gradually diminishes as the effects of digestion wear off and the blood becomes less concentrated, till, in the second week, the lymphocytes are increased as at birth. The percentage of eosinophiles is, as a rule, greater than in the adult blood.

Uterus Bicornis Unicollis.—The influence of this uterine anomaly upon gestation, parturition and puerperium is the subject of a paper by A. BONI (La Rassegna Ostet. e Gin., Mch., 1902). The following conclusions are drawn: (1) Abortion and premature birth are twice as frequent in uterus bicornis as in the normal uterus. (2) Podalic presentation is most frequent, and such cases are apt to go on to term. (3) Shoulder presentations are frequent. (4) Among the

most common complications in pregnancy is hemorrhage; this invariably leading to interruption of gestation. Spontaneous rupture of the uterus may occur. (5) In parturition the most frequent complications are (*a*) uterine inertia; (*b*) accidents to the fetus; (*c*) hemorrhage during parturition from placenta previa or other causes. (6) There may be dystocia due to shoulder presentations, anomalies of fetal movements, rupture of the uterus, incarceration of the non-gravid cornu in the pelvis. (7) Puerperal infection is rather more common than in the normal uterus. (8) Eclampsia is frequent and of serious form.

Artificial Sterility and Consumption.—In discussing the subject of the prevention of the spread of consumption by conception and childbirth, Pincus recently recommended that all women afflicted with this disease in a marked form should be castrated. He justified this view also from the standpoint of advantage to the patient in preventing her from conceiving while also combating so serious a disease. A. E. NEUMANN (Ctlblt. f. Gyn., 1902, No. 12), however, takes the opposite and perhaps the better view in the following terms: When women are overtaken by consumption in a severe form, Nature herself protects her from the very dangers of which Pincus speaks by suspending the function of menstruation and thereby the likelihood of conception. This is a fact which is well known among the people at large and to such a degree that most of them regard the return of their periods as a favorable sign or even an indication of recovery from consumption. It is a well-known fact that artificial menopause has more or less mental effect upon women, usually harmful and occasionally in very high degree. Neumann points out that, if in addition to the discouraging knowledge of the existence of consumption in the system, one adds that of unsexing, the chances are that the patients' recovery from consumption will be rendered less likely.

Osteomalacia and Castration.—The number of cases in which removal of the ovaries has been undertaken for the relief of an osteomalacia is comparatively small and every additional case reported should meet with attention. E. HOLLANDER (Deut. med. Woch., Apr. 3, 1902) operated on a patient, a nullipara, thirty-six years of age, who for ten years had been unsuccessfully treated for various rheumatic difficulties. The deformities developed gradually until the costal arch and the iliac crests approximated, the pelvis spread, walking became impossible on account of the secondary muscular paralysis; dyspnœa, pain and general disability were marked. A positive X-ray picture was difficult to obtain, because of the decreased resistance offered by the partially decalcified bones to the light rays. Medical treatment being without results, castration was done. The effects were almost immediate; in a few days the pains and dyspnea disappeared; walking was attempted in two weeks, and at the end of a month this was possible without assistance. The general health also improved. The author believes that the success of this treatment in such cases will lead to a more ready diagnosis and application of the proper means of cure in patients whose sufferings are attributed to rheumatism, arthritis deformans or spinal diseases instead of to the more likely lesions of chronic bone softening.

Gangrene of the Nipples.—This is a rare occurrence during the puerperium. R. VINCENT (Lancet, Apr. 5, 1902) reports a case which appears to have been due to an excessive use of or remarkable susceptibility to orthoform. The delivery and first days of the puerperium were normal. When cracked nipples appeared the usual methods of cleanliness and protection with a shield were employed, with the addition of dusting them liberally with orthoform; in a short time infection appeared, which in general resembled erysipelas, with the exception that the patient was not so ill as she ought to have been with that disease. In a short time both nipples became gangrenous, a line of demarcation was formed and both sloughed off at the base, leaving a granular area through which the milk-ducts could be made to deliver the milk by pressure on the breast. Recovery was subsequently uneventful. The remarkable feature of the case was that, though the nipples were lost, the ducts remained open so that at a future pregnancy the woman will be able to suckle her child with the aid of a shield.

Serum in Puerperal Fever.—Childbirth is a normal occurrence, though a large number of well-known factors may lead to grave diseases, among which puerperal fever is probably the most fatal. M. D. MAKUNA (Lancet, Apr. 5, 1902) reports a case in which he gave the woman subcutaneous injections of antistreptococcic serum. The significant thing about the result is that after these administrations were begun the systemic signs of infection, namely, pulse, temperature and prostration, steadily improved, and that on the third day when the temperature had reached almost normal and without interference the uterus evacuated a large clot of probably highly infected material. One must grant that it would have been better treatment to have evacuated the uterus by a digital curetting at the same time as the injections were begun. In the majority of cases the mere removal of as much of the débris as possible from the womb is a material aid in itself to the patient. However, as indicating the possibilities of combating the germs, this experience with the serum should be remembered.

Fetal Membranes as Therapeutic Agents.—Every one who has lived in among cattle is familiar with the fact that cows, after they are delivered of their young, eat their placentæ. The traveller Gemelli Carrere observed that among the Lakutes, in Russia, the father seized the afterbirth as soon as it was delivered, cooked it, and, together with his parents and friends, regaled himself upon it. Certain birds eat their own eggshells when their young are hatched. L. BOUCHACOURT (L'Obstétrique, Mch. 15, 1902) finds many examples of this custom among men and animals. Among animals the afterbirth may be eaten because it is useful to the alimentary tract, to protect the female from pursuit by other animals or simply as a hygienic precaution. According to the recent work of Latulle and Nattan-Larrier, the placenta is a gland with an internal secretion; hence, animals eat their placentæ that they may derive some benefit from its internal secretion. Such being the case the author believed that the human placenta might be employed as a therapeutic agent, and experimented upon various maladies with the following results: The placentæ of sheep, dried and powdered, were administered to five women and in every instance the mammary secretion was markedly increased, both in parous and nulliparous women. The chorion in doses of two to three grams a day was found to be beneficial when the breast milk was insufficient. Further, the placenta is mildly laxative. The author thinks it may be possible that the placenta of one species may be toxic for another.

Expulsion of Dermoid Cyst During Labor.—But four cases in which dermoid ovarian cysts have been expelled *per vaginam* have been found in the literature by F. W. N. HAULTAIN (Jour. of Obstet. and Gyn., Brit. Empire, Apr., 1902). In each of these cases forceps were used in the delivery. The literature contains six cases of various other ovarian tumors expelled in the same manner. The main feature in these cases is the management of the labor if obstructed by similar tumors impacted in the pelvis. This is rare, occurring

once in 4,000 cases. But if labor be left to the spontaneous efforts of Nature, a maternal mortality of 50 per cent. has been shown. The recognized modes of management may be summarized as follows: (1) Postural reposition of tumor into abdomen. (2) Artificial delivery *per vias naturales* (*a*) without diminishing size of tumor, (*b*) after diminishing size of tumor. (3) Cesarian section and ovariotomy. (4) Vaginal ovariotomy. One should never forcibly drag the child past the obstruction. The best results have been obtained by reposition and simple disintegration with a mortality of 12 per cent. Vaginal ovariotomy has been successfully performed in three cases. This result, if taken in conjunction with the extraordinarily successful termination of these spontaneously expelled, certainly strongly supports such a mode of procedure. Further, should an attempt at extirpation during labor be unsuccessfully made the condition of the patient is no worse than if mere disintegration had been employed, as the tumor may subsequently be removed *per vaginam* or by the abdominal route. The author believes that vaginal ovariotomy is a ready and safe method of treatment. In a certain proportion of cases, operation is contraindicated. In these simple reposition is less likely to do harm than any other mode of procedure. The author considers justifiable the removal of the tumor during labor or shortly after, because of the otherwise high mortality.

Development of the Uterus.—The examination of the uterus in unripe and ripe embryos by H. BAYER (Deutsch. Arch. f. klin. Med., Vol. 73) shows that the organ increases intermittently in size before birth. Its length at five months is 6.8 mm.; at six months, 8.2 mm.; at seven months, 8 mm.; during the eighth and ninth months, 20 mm., and at birth 37 mm. During the fourth, fifth and sixth months there is a general uniformity of shape, but from the seventh to the ninth months the cervix increases more rapidly, though at birth the body seems to be particularly developed. The ovaries also increase in size during fetal life, but not markedly so, and all growth seems to cease at the seventh month. From the first year of life up to puberty hardly any changes occur in the uterus, except occasionally an enlargement of the posterior wall; with the advent of menstruation, however, the organ generally returns to its adult form owing to sudden, rapid growth shortly before the appearance of the first period. In marked contrast to the conditions in fetal life, the development of the ovaries in the post-fetal stage goes hand in hand with that of the uterus.

EYE, EAR, NOSE, AND THROAT.

The Grippe Ear.—The peculiarities of grippe affections seem to be fully as manifest in ear complications as in other parts of the body. M. A. GOLDSTEIN (St. Louis Med. Rev., Mch. 22, 1902) says that an acute otitis media consequent upon a grippe infection is not usually of the simple catarrhal form, but rather ushered in by a symptom-complex and an intensity and a diffusion of pain about the ear which are at once characteristic of influenza. In grippe there is a sudden, intense, deep-seated pain, involving much of the temporal region, with tenderness over the mastoid area and profuse serous effusion into the middle ear. Vertigo and persistent hemicrania are also characteristic of "the grippe ear." Paracentesis should always be done as soon as the diagnosis can be made even if there be very little or no bulging. Free drainage is far more important in these cases than in the simple serous cases. Marked deafness is another important feature beginning very early at times and lasting till the end, or it may come on late and persist most tenaciously in spite of all treatment. The early symptoms of mastoid disease seem to be due largely to a neuralgia so constant in influenza of every type.

Mucin in Rhinology.—In these days one is happily able to bring the products of the laboratory to the service of the patient. No better example can be adduced than the various serums now employed. W. STUART-LOW (Lancet, Apr. 5, 1902) has been experimenting with solutions of mucin in those conditions of the nose, throat and ear which are characterized by deficient or unhealthy nasal secretion. This product mucin acts in the laboratory in the following way: It is highly antibacterial, because solutions of it remain on exposure to the air sterile for a long time. It is also hygroscopic, somewhat like glycerin, only about one-quarter as actively. Professor Arloing has obtained similar results from mucidin, which is a solution of the mucus from red snails. Stuart-Low finds that in practice its action is soothing and emollient, moistening the surface and softening the crusts, thereby facilitating their removal and preventing re-formation, thus correcting fetor. This last is one of the best points in its favor as a local remedy. Through its hygroscopic effect, it restores the sense of smell, filters and warms the air and permits the nose to resume a more normal condition. He uses 5 grains of mucin, 5 grains of sodium bicarbonate, and 1 grain of menthol, dissolved in 1 ounce of sterilized warm water. Sometimes a better solution is obtained by using equal parts of sterilized warm water and sterilized warm lime-water. Application of it is made by a spray, douche, syringe or swab. The spray apparatus should be coarse to obviate clogging with undissolved particles of mucin. Thick crusts demand removal with the swab and massage. Surprising results have been obtained by him in cases which for years had proved obstinate to the great majority of ordinary means of treatment.

Nasal Vertigo and Epilepsy.—Two cases of nasal vertigo and epilepsy are reported by A. JOUSSET (Rev. Hebd. de Laryng., Rh. et d'Otol., Mch. 15, 1902), who also briefly cites Collet's case, thus: The patient felt pricking in the nose followed by sneezing and a sharp pain in the neck; he immediately lost equilibrium and fell forward, extending the hands to break the fall and not completely losing consciousness. Peripheral excitation came from a hypersensitive spur. The author's cases are as follows: Man, twenty-six years of age, has difficulty in breathing, sometimes pricking in the left naris, a little afterward sense of weight in the head and tingling in the limbs. Some nervousness is then followed by slight loss of consciousness. Face at first congested, grows pale and then the patient becomes weak. Enormous deviation of the septum on the left side from a fall twelve years before. Moure's operation was done on the septum to give free respiration. Symptoms all disappeared except some nervousness. Nasal aura. Man, thirty years of age, subject to attacks of epilepsy, relieved till two months before by bromides; since then attacks more frequent and more serious, apparently due to pains in the nose followed by troublesome flow of secretion. Pricking, nervousness and dull weight in head precede the attacks. Hypertrophic rhinitis on left side, atrophic on the right. Galvanocautery reduced hypertrophies and for ten months after the patient did not fall. Nasal aura removed by treatment of hypertrophies of the turbinates.

Neuralgia in Epiphora Cases.—Four new cases of neuralgia associated with disease of the lacrimal canal in women over sixty years of age are given by M. BETTREMIEUX (Annales d'Oculistique, Mch., 1902, p. 223) in his communication to the Belgian Ophthalmological Society. The first case was cured by catheterizing and then injecting nitrate of silver, after which the patient remained well for three months. The sec-

ond, an ozena case, is improving. The other cases improve as the canal is being treated. The author emphasizes the need of being more watchful for nasolacrimal troubles in cases of tic. According to Von Frey's researches, controlled by Fournier and Coutin, there exist in the skin and mucosa special neurons for sensibility to pain. The conjunctiva is richly supplied with them. The lacrimal canal is the most favorable location of the region innervated by the trigeminus for producing radiating pains. The neurons swollen in an inextensible bony canal may easily produce them.

Solutions for Nasal Mucosa.—The pain caused by application to the pituitary membrane of pure water or of water containing a small percentage of minerals is due to the difference between the molecular concentration of the liquid and that of the blood, says DEPIERRHIS (La Habana Medica, Mch., 1902); therefore the addition of a small amount of salt is advised. Solutions of sublimate, 1 to 1,000 and even 1 to 4,000 are extremely painful to the nasal mucosa, but the addition of sodium chloride in the proportion of 9 to 1,000 renders the solution entirely painless. The same is true of applications of bichloride to surfaces denuded of skin.

Meningitic Ocular Troubles.—In a recent communication A. LEPRINCE (Annales d'Oculistique, Mch., 1902) recalls the case of Leillais, presented to the last French Ophthalmological Congress, which was one of typhoid fever with change of vision and incomplete paralysis of the right motor oculi, followed three years later by meningeal symptoms. The author's case was that of a student, nineteen years of age, who, in 1872, after three days of ill-defined visual troubles, felt violent pain in the nape of the neck and in the coccyx. Acute meningitis developed, with vomiting, relaxed sphincters and paralysis of the right side. Slight improvement in three weeks was followed by relapse with diplopia and divergent strabismus of the right eye. Fifty days after the first symptoms he became blind and remained so one month, not knowing night from day. Then the blindness began to diminish in the left eye. The disease ceased as abruptly as it had begun. A violent crisis, marked by extreme pains in the limbs and head at five o'clock in the morning was followed by the patient rising at half-past nine o'clock and declaring himself well. No relapse followed. Examined four months after the onset, his vision O.D. was found to be uncertain, O.S. $^1/_{15}$. He lived two years in the country and vision gradually improved. Eight years later, in 1880, he went to Paris and consulted Abadie, who advised electricity, which he refused. The author saw him first in October, 1901, when his vision O.D. was $^5/_{10}$, O.S. $^9/_{10}$, and the right visual field less than the left. Under electric treatment vision O.D. increased in one month to $^9/_{10}$. No fundus change. The author remarks that "it is well not to be too pessimistic about post-meningitic ocular complications." It is further narrated that the attack came to this patient suddenly when in good health without traumatism or primary affection. The eye-troubles could indicate meningitis alone. This Terson and Abadie questioned, notwithstanding the patient's circumstantial recollections of the treatment given him.

The author further notes, in his case, that when receiving electrical treatment, if he had had one or two hours less than usual of sleep his resistance ran up to 20 Chardin elements without deviating the galvanometric needle, whereas, in himself, two cells gave him 5 milliamperes (one pole on the neck, the other on the eye). This was a frequent experience. After a good sleep 3 cells gave 5 milliamperes. [It is a question whether these were really cases of meningitis.—Ed.]

Cause of Glaucoma.—The ophthalmoscope has not, as was expected, cleared the mystery of the cause of glaucoma; this is evident by the number of theories promulgated. A new one is advanced by L. LAQUEUR (Deutsch. Arch. f. klin. Med., Vol. 73). As a result of the examination of rabbits' eyes, secretory fibers, distinct from those innervating the vessels, were discovered, irritation of which causes an increase of the intraocular fluids. This hypersecretion leads to the attack of glaucoma as soon as the mechanism regulating the pressure within the eye fails. The presence of these fibers in man and their probable course is not settled, but it is likely that they run in the cervical sympathetic. The good effects following removal of the sympathetic ganglion in glaucoma would thus find an explanation.

PHYSIOLOGY.

Secretion of the Pancreas.—It has long been known that acid in the duodenum causes a flow of the pancreatic juice, even after nervous isolation of the two organs, as shown recently by Popielski, Wertheimer and LePage. Wertheimer produced the same phenomenon by acid in the jejunum, but not at all in the lower part of the ileum. These authors concluded that the secretion is a reflex, with its centers in the ganglia of the pancreas, or, with the jejunum, in the solar plexus. W. M. BAYLISS and H. STARLING (Lancet, Mch. 22, 1902) refute this contention in the following terms: Secretion excited by acid in the jejunum cannot be reflex because it occurs after all the nervous elements have been destroyed and after intravenous injections of atropine sulphate. It must therefore be due to direct gland-cell excitation by a substance conveyed to the gland from the bowel by the blood-stream. This substance is not acid. Wertheimer has shown that a 0.4-per-cent. solution of hydrochloric acid injected into the blood does not excite the pancreas. The secretion must be due to a substance produced in the intestinal mucous membrane under the influence of the acid and carried thence by the blood to the gland. Experiment confirmed this conclusion, exposure of the mucosa of the jejunum and duodenum to the action of 0.4-per-cent. solution of hydrochloric acid produced a body which injected in small doses into the blood-stream caused great activity of the pancreas. This body, called *secretin*, is associated with another which lowers the blood-pressure. They are not identical since acid extracts of the lower end of the ileum produce a pressure-lowering effect, but not excitatory. The acid splits off the *secretin* from its precursor, *prosecretin*. The latter is slightly soluble in 0.9-per-cent. solution of sodium chloride and is without influence on the pancreas. The former may be obtained separately from it by boiling with the above salt solution. The acid extract may be boiled, neutralized and filtered without damage, giving in the filtrate primary albumoses and gelatin which may be precipitated by excess of alcohol and ether and have no action on the pancreas. This alcoholic, etherial filtrate contains only a small amount of organic matter, but on evaporating to dryness and taking up the residue with water the solution obtained is as active as the original secretin. This is probably a body of definite composition and small molecular weight. A chemical sympathy between different organs, *e. g.*, the uterus and the breasts, has been assumed, but this is perhaps the first case of direct experimental proof. This acid-duodenum-pancreas mechanism may prove to be but one of a whole class of similar mechanisms. The study of this should materially increase control of the various chemical functions of the body and probably of their diseases.

THERAPEUTIC HINTS.

Prolapsus Ani in Children.—In most cases reduction is accomplished by laying the child across the lap and making gentle pressure upon the tumor with oiled fingers. After reduction the child should be kept upon its back for at least an hour. If the bowel tends to come down with every stool, the buttocks should be pressed together during defecation. An infant should be on its back while defecating, and an older child on an inclined seat; a low chair or any position in which straining is easy should be avoided; constipation demands laxatives. Tenesmus may be overcome with ice-water sponging or by small injections of ice water containing four per cent. of tannic acid. If the bowel comes down very easily, this may be prevented by an adhesive strap across the buttocks. In flabby infants the bowel may protrude in the intervals between defecation, and reduction may become so difficult that it is necessary to apply cocaine and stretch the sphincter with the fingers. A firm pad held in place by a T-bandage is applied after the insertion of a suppository containing gm. 0.015-0.6 (gr. ¼-i) of cocaine. When these measures fail the protruding part may be marked by the Paquelin cautery with lines at intervals of an inch. Strychnine injections may be useful.—L. E. HOLT in "Diseases of Infancy and Childhood."

Scarlet Fever.—Throughout the disease a tepid sponge-bath should be given twice a day, followed, when there is itching or desquamation, by inunction from head to foot with cold cream, carbolized vaseline, lanolin, cacao-butter, eucalyptus oil or

℞ Ol. olivæ	4.0	(℥i)
Vaselini Lanolini aa. q.s. ad	60.0	(℥ij)

One or two per cent. of menthol added to this will generally relieve intense itching. The pharynx may be treated with boric-acid solution, 1 per cent. carbolic acid in lime-water, peroxide of hydrogen, or

℞ Menthol	0.2	(gr. ij)
Thymol	0.0065	(gr. 1/10)
Ol. gaulther.	0.12	(♏ij)
Glycerin	15.0	(℥iv)
Chlorophylli solut. aquos, q.s. Aquæ ad	240.0	(℥viij)

M. Use as spray or gargle.

Cracked ice or irrigation with hot water to which glycerin has been added promotes the comfort of the pharynx. The best antiseptic is cold water, or occasionally quinine or phenacetin, or the cold pack. Ordinary cases may be given an initial dose of calomel, and

℞ Tinct. ferri chloridi	8.0	(℥ij)
Acidi hydrochlor. dil	4.0	(℥j)
Syr. limonis	30.0	(℥i)
Aquæ ad	90.0	(℥iij)

M. Sig: A teaspoonful every two or three hours.

Or, as recommended by Yeo:

℞ Liq. ammoniæ acetatis	45.0	(℥iss)
Potass. chlorat.	4.0	(℥i)
Syr. limonis	15.0	(℥ss)
Aquæ	180.0	(℥vi)

M. Sig.: One to three teaspoonfuls every four or five hours.

In case of hard, rapid pulse, tincture of aconite in one-drop doses may be added to the foregoing for forty-eight hours. When the pulse is weak, soft, and of low tension, Holt advises digitalis.—W. T. CORLETT in "Acute Infectious Exanthemata."

Gastro-Intestinal Hemorrhage in the Newborn.—In a case in which there were frequent vomiting of blood and blackish stools, L. E. HOLT (Archives of Pediatrics, Apr., 1902) administered gm. 0.06 (gr. i) of the saccharated extract of suprarenal every hour for several doses, after which the dose was reduced one-half owing to difficulty in swallowing from the astringent effect on pharynx and esophagus. Twelve hours after beginning the medication, the hemorrhage ceased and did not recur. The child then began to nurse well, and three months later was reported well in every respect. In the author's experience few things have been more unsatisfactory than the treatment of severe gastro-intestinal hemorrhages in the newly-born, the large majority of cases succumbing in a very short time. The solution of adrenalin is possibly to be preferred, as one grain of the extract makes a rather large dose for an infant. In the discussion it was brought out that often the powdered extract failed to stop hemorrhage when an aqueous solution was effective.

Diabetes in Children.—

℞ Antipyrin	10.0	(℥iiss)
Glycerin	30.0	(℥i)
Aquæ	150.0	(℥v)

M. Sig.: One to four teaspoonfuls a day; and

℞ Strych. sulph.	0.0005	(gr. 1/120)
Sodii arsenat.	0.001	(gr. 1/60)
Codeinæ	0.01	(gr. ⅙)
Quininæ valerianat.	0.05	(gr. ⅚)

Ext. valerianæ. q. s. ad pil. No. I.

Sig.: One to six such pills at meals according to age.

To replace sugar for sweetening, use

℞ Saccharin	3.0	(gr. xlv)
Sod. bicarb.	2.0	(gr. xxx)
Mannite	50.0	(℥i ℥v)

M. Et divid. in 100 tablets or lozenges.—COMBY in "Le Progrès Médical," Jan., 1902.

Dropsy in Heart Disease.—Rest, light diet and purgation will be effective in some cases. Later it becomes more obstinate and cardiac stimulants, and diuretics must be given. Diaphoretics, the hot-air and vapor baths are not to be thought of. Digitalis is a most efficient diuretic, and when the renal secretion is not free under its use its action may be excited by the addition of strychnine, sparteine or caffeine. Nitroglycerin may also be prescribed, especially in cases with arterio-sclerosis. An unirritating, yet highly effective diuretic is:

℞ Potassii acetatis	4.0	(℥i)
Infus. digitalis ad	60.0	(℥ij)

M. Sig.: Tablespoonful every three hours.

Salines and elaterium, podophyllin and belladonna may be used in the order named to deplete the venous system. Compound jalap powder may also be prescribed. With a large liver and ascites, or a history of syphilis, mercury is applicable, a good combination being

℞ Pulv. digitalis		
Pulv. scillæ aa.	1.0	(gr. xv)
Hydrarg. massæ	2.0	(℥ss)
Ext. bellad.	0.0375	(gr. ⅝)

M. ft. pil. No. xv.

Sig.: One every three or four hours.

When efforts at relieving the dropsy fail, the most dependent or most swollen parts of the body should be scarified under strict antiseptic precautions. Fine silver trocars with rubber tubes attached may be inserted and the liquid allowed to drain off gradually.—J. M. ANDERS in "Practice of Medicine."

Kassowitz's Formula for Rickets.—

Phosphori puri	0.01	(gr. ⅙)
Solve in ol. amygdal. dulcis	10.0	(℥iiss)
et adde		
Pulv. acaciæ	5.0	(℥i ¼)
Syrupi	5.0	(℥i ¼)
Aq. destillat.	80.0	(℥ij ℥v)

Ft. emulsionem. Dose: One to two teaspoonfuls a day.—FISCHER in "Infant-feeding in Health and Disease."

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HUMAN AND BOVINE TUBERCULOSIS AND IMMUNITY.

FOUR years ago this month a foreign correspondent of the MEDICAL NEWS visited the beautifully situated laboratories of Professor Behring in Marburg and in describing them called attention to the fact that Professor Behring was then devoting himself almost exclusively to the study of tuberculosis. That study had already been carried on for several years. It is only now after over six years at the work of investigation that the result of Professor Behring's observations are given to the world. It is announced that the advance sheets of his book on tuberculosis have just made their appearance in Berlin. He is to be commended certainly for the patience with which his investigations have been followed up before publication. Six years is not very long for the investigation of so great a subject, but in the modern haste to get into print it is very commendable to find that Horace's maxim, *nonum prematur in annum* (keep your subject under consideration for nine years), should be almost literally followed with regard to a great scientific subject.

Two things are of special interest in the new book, according to the cable reports. Professor Behring announced during his recent visit to Stockholm, when he received the Nobel prize for the greatest advance in medicine during the last ten years, that he felt he could with confidence assert that bovine and human tuberculosis were essentially the same disease and were due to the same specific cause. Part of the present publication is devoted to the elucidation of the grounds for this opinion. Professor Behring has investigated the subject, especially from the chemical and physiological standpoint of the living and dead micro-organisms. His studies of toxins and antitoxins in a number of other diseases have particularly fitted him for success in the elaboration of this as yet little illustrated aspect of the tuberculosis problem.

The other question of special interest treated in his book involves the question of protective inoculation for tuberculosis. Marburg is beautifully situated in the midst of a smiling agricultural country in which there are many dairy herds. Professor Behring has found by actual experience in these farms that cattle can be inoculated with tuberculosis when very young and can be rendered absolutely immune to the disease later in life. The possibilities of medical progress involved in such a discovery are no doubt very great. Direct inoculation of human beings, of course, is entirely out of the question; but the development of this subject will undoubtedly bring important advances in the therapeutics of even human tuberculosis. The details of Professor Behring's work will be looked for with the greatest interest and we hope shortly to be able to give them to our readers.

BLOOD-PRESSURE DURING PREGNANCY.

THE so-called cardiac hypertrophy of pregnancy, with its associated increase of arterial tension, was the subject of one of the papers presented at the recent meeting of the Association of American Physicians. It was shown that the assumptions of the French school, with which American teaching has hitherto been in perfect accord, are erroneous. In seeking the origin of the old belief concerning cardiac hypertrophy it was found that this rested largely upon a mistaken interpretation of the fact that the apex of the heart is displaced during pregnancy. An inquiry into the question of blood-pressure showed that no constant rise occurred during the gestation period.

Now that methods of ascertaining arterial tension in the human subject are clinically available, it is important that normal variations in blood-pressure be thoroughly understood, for not until

this knowledge is established, can clinical findings serve as therapeutic guides. From this standpoint the paper referred to is of definite value; for, if a departure from ordinary blood-pressure during pregnancy be no longer regarded as a physiological phenomenon, its occurrence in a given case demands that its cause be sought and if possible removed.

There is no doubt that an increase of arterial tension does occur in some cases during pregnancy. In these instances, abandoning the theory of cardiac hypertrophy, as well as that of a mere increase in the quantity of circulating fluid, it is the duty of the physician to look promptly to the eliminative functions of his patient. Changes in the mental and nervous condition may be responsible for the enhanced tension, or the latter may be due to disturbed metabolism resulting from lack of exercise; but a far more probable cause and one immeasurably more important is a disturbance of renal function. In the course of recent inquiry into this very subject of the cardiac hypertrophy of pregnancy in one of the lying-in hospitals of this city, the accidental discovery of unusually high tension in one case led to the diagnosis of a previously unsuspected serious renal complication.

When high arterial tension exists and is thought to be due to an accumulation of waste products, or, in other words, to defective kidneys, the symptomatic use of nitrites must be understood to deal with the condition of high tension itself rather than its cause, except in so far as the nitrites are diuretic and diaphoretic. Rational treatment in these cases must be both eliminative and prophylactic. The indications are to reduce the quantity of animal food, to cut off the supply of alcoholic beverages, to use water freely and to purge liberally, preferably with mercury.

INFANT-FEEDING AND THE SECOND SUMMER.

THE popular belief that represents the second summer as so lamentably fruitful in infant mortality is too well grounded in sad experience for its warning to be neglected. Notwithstanding the advances made in scientific infant-feeding during recent years, and the consequent reduction of the infantile death-rate in our large cities in the hot weather, the second summer still maintains its unenviable reputation.

The change in diet that is necessitated about the beginning of the second year of child-life almost inevitably brings digestive disturbances in its train and these provide the foundations for pathological changes which the exhaustion of summer heat and its accompanying infectious material find a ready support for mortal ailments. To delay the employment of mixed diet, on the other hand, by an exclusive milk feeding until the dreaded second summer is past, is to run quite as serious a risk of lowering the child's resistive vitality by insufficient nutriment and, while avoiding the Charybdis of gastro-enteric affections, to run into the Scylla of constitutional malnutrition.

It is evident that the dangers of the second summer must be avoided by prophylaxis of the gastro-enteric disturbances that are the root of its evils rather than by a dangerous simplification of diet. To be effective the prophylactic measures must begin, not when the child is already ailing, and not during the heated term itself, but when the first warm weather begins to be felt in the early part of May. The development of the molars—the true grinding teeth—during the second year shows Nature's evident intention of providing the means for the proper preparation of mixed diet. There seems to be little question that after milk the first article added to the diet list should be some form of cereal. If for three or four months at the end of the first year of life some form of cereal gruel has been added to the milk the transition to a mixed diet is much easier than it would otherwise be. As to what the cereal shall be seems to be a matter of indifference for healthy children, although barley in some form seems to agree with more children than almost any other cereal. When, by inheritance and habit, children are of constipated tendency, oatmeal seems a better grain to begin with. When there are any signs of loose bowels, it must, however, be stopped at once and one of the blander cereals must be substituted—barley or wheat or even corn in the form of hominy, although there are many children with an idiosyncrasy against corn in any form.

The most serious objections to the use of the cereals in infant-feeding at the end of the first and at the beginning of the second year is undoubtedly the present-day tendency not to cook grain in any form sufficiently before it is eaten. Our grandmothers knew that oatmeal, or cornmeal, or hominy, had to be cooked for hours in order to be thoroughly digestible. The modern cook finds such slow cooking entirely too bothersome. As Dr. Holt said at the April meeting of the Pediatric Section of the New York Academy of Medicine (see MEDICAL NEWS, p. 808) no cook

in New York gets up in time to cook a cereal properly for a child's breakfast and so this part of the meal must always be prepared over night. We are deluged with prepared cereal foods of various kinds at the present time. All of them are of about equal value, but nearly all of them make the mistake of advertising that they need much less time for their preparation for the table than is really the case. It would seem a good rule to multiply the time given in the directions by three whenever a cereal is to be prepared for children's use.

After cereals, other starch products such as bread and potatoes are useful, but require special directions if they are not to prove irritating. Children are often encouraged in the practice of eating the soft center of bread and leaving the crust. Needless to say this is just the opposite of the practice that should be encouraged. Bread should be given mainly as crusts, or so stale or toasted that considerable chewing is necessary. The saliva means too much for the digestion of wheat starch for this rule to be neglected with impunity. With regard to potatoes it is doubtful if any form of preparation that uses only the heat of boiling water ever makes them readily digestible. Baking is done at a temperature nearly 200° above the boiling-point and this produces a bursting and alteration of the potato starch granules that make them comparatively easy of digestion even by the child's digestive juices. When only boiling-water is employed most of the starch remains enclosed in an impermeable envelope of cellulose material. The green vegetables, such as spinach, are of use particularly for anemic children, but must be very carefully prepared and thoroughly screened.

As a matter of fact the source of many digestive disturbances to which later serious summer complaints are added is to be found in allowed indiscretions of diet. Concentrated sweets, uncooked fruit, apples, plums, bananas and the like, are always dangerous, no matter how apparently healthy the child may be. Table food of various kinds not especially prepared for children is another source of danger. If the original digestive disturbance can be avoided the serious, even fatal, gastro-enteritis will not develop. At the first sign of gastric trouble the diet must be limited. The sick child must not be tempted to eat; above all dainties must not be provided to stimulate the protectively lowered appetite and the whimpering of the child for some forbidden article of diet that, because of the caprices of a diseased appetite, it craves, must not be indiscreetly satisfied. If good habits in these matters be formed in May and June, July and August will lack many of their wonted dangers during the dreaded second summer.

ECHOES AND NEWS.

NEW YORK.

Willard Parker Hospital Service.—A competitive examination for the selection of candidates for the position of interne to the Willard Parker and Riverside Hospitals will be held at the Willard Parker Hospital on Saturday, May 31, 1902, at 2.30 p.m. Each candidate is to serve one year from July 1, 1902, to July 1, 1903. The service consists of about four months as interne at the Willard Parker, four months as interne at the Riverside and four months as ambulance surgeon. Candidates must be graduates in medicine. Internes live at the hospitals during the time of service. No salary is attached to the position. The hospitals are devoted to the treatment of contagious diseases and their complications. Applications in writing should be sent to Dr. Henry W. Berg, 923 Madison Avenue, New York City, Secretary of the Medical Board. Consulting hours 3 to 4 p.m.

Dr. Jacobi Resigns.—Dr. Abraham Jacobi, after thirty-two years' active service in the College of Physicians and Surgeons as professor of diseases of children, has tendered his resignation to that institution and will retire at the end of the present term. Dr. Jacobi enjoys an exceptionally high standing in his profession, and the announcement that he would leave their ranks was received with many expressions of regret by his colleagues. He became lecturer on infantile pathology in the College of Physicians and Surgeons in 1857, and in 1860 the first chair upon diseases of children established in America was instituted in the New York Medical College, with Dr. Jacobi as professor. In 1865 he was professor of diseases of children in the University of New York, but resigned to become clinical professor of diseases of children in the College of Physicians and Surgeons. In 1895 he received an offer of the clinical professorship in one of the largest schools in Germany, but he refused to leave the land of his adoption.

New York Academy of Medicine.—A stated meeting will be held Thursday evening, May 15th. The following program has been arranged: "Stomach Vertigo," by Charles Sumner Fischer, M.D.; "Tympanic Vertigo," by William P. Brandegee, M.D.; "Neurological Diagnosis of Vertigo," by Pearce Bailey, M.D.

PHILADELPHIA.

Contagious Diseases.—For the week ending May 4th the morbidity of the various contagious diseases was very satisfactory, with the single exception of scarlet fever. That disease is giving cause for alarm in some sections of the city, the week showing 103 new cases and 7 deaths. Typhoid fever showed a very decided decrease, as did also smallpox, there being but 15 new cases and 1 death from the latter disease.

Liberal Donation to Consumptives Hospital.—After visiting the White Haven Sanatorium of the Free Hospital for Poor Consumptives and seeing for himself the admirable work which is being done there in behalf of sufferers from tuberculosis, Henry Phipps has presented $2,500 to the Free Hospital. The gift will be used to provide ten additional beds at the Sanatorium for one year. Forty male patients are now being cared for there and there are forty-five on the waiting

list. Ground is to be broken this week for the construction of three new cottages which are to be used exclusively for women.

Jury Condones the Use of Boric Acid in Butter.—J. M. Jones, a creameryman of West Grove, who was prosecuted by the State Dairy and Food Commissioner on the charge of using boric acid in the adulteration of butter, was acquitted of the charge May 1st. The defendant acknowledged the use of the acid in the proportion of six ounces to seventy-five pounds of butter and in his contention that this amount was harmless to the consumer he was borne out by several physicians. Boric acid is used as a preservative by all the butter dealers of the county, hence this case was looked upon as a test case.

Children's Seashore House.—This institution at Atlantic City will open early in June, although the new buildings are not yet fully completed. It has three departments—one for girls between fourteen and twenty years of age, one for girls from three to fourteen years, and boys from three to twelve years, and a third for sick infants under three and one-half years, accompanied by their mothers. In the new buildings between Annapolis and Richmond Avenues there are accommodations for 325 children and 32 mothers. During the summer of 1901 the institution was open 101 days and cared for 1,901 children. The physician in charge is Dr. W. H. Bennett of this city.

Corner-stone of New Samaritan Hospital Laid.—The corner-stone of the new building for the Samaritan Hospital was laid May 3rd. This hospital was started in 1893 in one dwelling-house. The new buildings will give the institution accommodations for 100 patients. The president, Rev. Russell H. Conwell, in his address emphasized the fact that the institution had been made possible by poor men: "We have not received contributions from the rich," he said, "but from poor laboring men and women who love humanity." A row of bricks each bearing the name of a person who contributed one dollar will extend around the building.

Dr. Bryson Operates in Philadelphia.—Dr. John J. Bryson of St. Louis operated in Dr. Horwitz's clinic at the Jefferson Hospital, May 2nd. The operation was a perineal prostatectomy and Dr. Bryson's work was most highly praised by the large number of surgeons who witnessed it. The prostate was enucleated in three pieces within twelve minutes from the time the incision was begun, the entire operation occupying but seventeen minutes.

Homeopaths Denounce the University.—The homeopathic physicians of this city are resenting more or less pronouncedly the action of Dean Marshall of the University of Pennsylvania regarding the inquiry of a homeopathic physician regarding the post-graduate spring course at that institution. The letter of inquiry contained the sentence, "I am a graduate of Hahnemann College of Philadelphia, 1900, and am anxious to do post-graduate work in clinical medicine and pathology." The following reply is stated to have been received from the Dean: "Dear Doctor: In reply to your letter of April 16th, I would say that the post-graduate course which is to begin early in May is designed for graduates of regular schools of medicine." It is claimed by homeopaths that the other schools of medicine in this city admit homeopathic graduates or students if they are able to pass the required examination given to all applicants. The *Hahnemannian* says in part: "It is mortifying to us, as citizens of Philadelphia, to think that the University of Pennsylvania has the ignominy of standing alone as the only college in the country refusing to take homeopathic graduates as students. It was only a few years ago that the Association of American Medical Colleges ruled that it was proper to accept for advanced standing students from any college, if found qualified on examination."

Pin Vomited after Sixteen Years.—At the Academy of Surgery, May 5th, Dr. W. Barton Hopkins exhibited a corroded brass pin of the ordinary size, which had been vomited by a woman sixteen years after it had been swallowed. Vomiting had been the main symptom.

A Case of Spina Bifida.—A case of spina bifida was operated upon by Dr. DeForest Willard. The type was that of meningo-myelocele. The opening left by removal was closed by an osteoplastic flap brought from the posterior superior spine of the ilium of each side. Healing has been prompt and the child is doing well, with the exception of having a moderate degree of hydrocephalus. A point made was that during the operation the child was kept on its face instead of on its side, thus allowing very little fluid to escape.

The Effect of Pistol Shots at Close Range.—Dr. John H. Brinton gave an exceedingly interesting description and demonstration of this subject, the experiments being a continuation of those begun by the late Dr. Fish. It was demonstrated that with the use of black powder the relative position of the pistol can be determined. Surrounding the bullet-hole is a blackened area due to the powder and in addition to this is on one side a projecting brownish area called the brand. This is caused by the smoke, gases, and powder and is due to the recoil of the pistol, as in cases in which the pistol is fired when held firm by a vice this brand is absent. The point in regard to the brand is that it is to that side of the bullet hole through which a line from the hammer to the sight of the pistol passes. Consequently it can be told whether the hammer side was held up, down, or to either side. With the new smokeless powder this does not hold good.

Obituary.—Dr. John S. Miller, formerly connected with several hospitals of this city, died last week in Denver, Col., where he had gone two years ago on account of failing health. Dr. Miller was one of the physicians of this city who went to the relief of the sufferers from the typhoid epidemic at Plymouth, Pa., and later to the scene of the Johnstown flood.

Dr. Cyrus D. Hottenstein, for more than twenty years physician to the Working Home for the Blind and long connected with the medical service of the Pennsylvania Railroad, died at his home, April 29th. Before coming here Dr. Hottenstein practised in Wisconsin for some years and served during the Civil War.

Dr. Henry C. Yeagly, President of the State Eclectic Medical Examining Board, died at Lancaster, May 2d of pneumonia.

CHICAGO.

More Study for Medical Students.—At a recent meeting of members of the State Board of Health plans were discussed to lengthen the term eight months over the present required minimum of four years. The Committee on Administration of the Medical Practice Act discussed this and other matters within their jurisdiction. The Board meets quarterly to consider questions relative to the requirements in medical courses. It is said, that three years ago they fixed a minimum course for all colleges at four years of six months each. They now propose to lengthen each year's course two months. If this plan be approved by the whole Board, it will affect the senior students of all colleges in 1903, and the students who expect to graduate in 1906 will have studied eight months more than graduates of this year.

Aid to Hospitals.—A musical and dramatic entertainment was given by Mrs. Potter Palmer, at her residence, April 23d, in aid of the Maurice Porter and St. Luke's Hospitals, which netted between $600 and $700 each for these institutions.

Structure of the Lung and Its Blood and Lymph Supply.—This was the title of an address delivered by Professor W. D. Miller of the University of Wisconsin before the students of the Northwestern University Medical School May 2d. Professor Miller has made special research in lung anatomy and circulation. His lecture, therefore, was listened to with great interest.

Officer of the Day at Cook County Hospital.—The officers of the day at Cook County Hospital are evidently rapidly exhausting their supply of recommendations. The following recommendations have been made: First, that an additional ward be established for scarlet fever and diphtheria cases. This is all right. Second, that each house physician and surgeon be clad in a spotless white duck uniform. Third, that a dressing-room be established in connection with the examining-room. Fourth, that the wards be brightened by pictures. Fifth, that the system of ward cooks, recently inaugurated, be continued.

Departure of Dr. Senn.—Dr. Nicholas Senn has left this city en route for Russia, as a delegate to the International Red Cross Association which meets in Moscow this month.

Verdict in Favor of Dr. Moras.—Dr. Edmund R. Moras was given a verdict against the West Chicago Street Railway Company of $45,000, for injuries sustained by him six years ago, which resulted in the amputation of his left arm at the elbow.

Appointment of Dr. Stearns.—Dr. Wm. G. Stearns, formerly medical superintendent of the Illinois Eastern Hospital for the Insane at Kankakee, and recently connected with the Neurological Department of Northwestern University Medical School and of the College of Physicians and Surgeons, has been appointed superintendent of the Sanitarium at Lake Geneva, Wis.

Meeting of Nurses.—The Nurses' Associated Alumni of the United States held their fifth annual convention at the Lexington Hotel, April 30th, May 1st and 2d. Dr. John B. Murphy gave a surgical clinic at the Mercy Hospital and Dr. Arthur R. Edwards a medical clinic.

Necessity for a Children's Hospital.—Poor children suffering from contagious diseases are constantly turned away from the County Hospital because there is no room for them. City and County officials favor the establishment of a sanitarium devoted exclusively to the treatment of such cases. In March and April more than two thousand persons were reported to the Health Department as stricken with various ailments. According to officials of the County Hospital, lack of adequate facilities at the County institution for the care of contagious diseases is daily becoming more apparent. In Ward 28 there were housed on one day seventy-one patients, while the normal capacity is only forty-five. Patients were compelled to sleep in the halls and upon the floor. It is said that if more patients are placed in the wards, the authorities will have to use the hammock or upper and lower berth plan.

Hemorrhoids; Their Pathology, Indications for and Technic of Operative Treatment.—Dr. J. Rawson Pennington read a paper on this subject. The author defines and describes hemorrhoids, then divides them into three principal varieties, internal, external, and interno-external. He said the two former varieties may be subdivided still further. The principal factors entering into the etiology and pathology of hemorrhoids were classed under constitutional, mechanical and local. After speaking at length of the pathology of hemorrhoids, the author takes up the indications for operative treatment and among them he suggests the following: (1) Frequent recurring hemorrhages, even though small in amount. Continual loss of blood, must, sooner or later, be followed by profound anemia, accompanied with pallid features, dizziness, and palpitation of the heart. (2) Frequent protrusion of the tumors, causing pain and distress to the individual. (3) Repeated attacks of inflammation. (4) Those cases in which the piles remain outside the anus after defecation and require manual replacement. (5) Those which protrude on slight exertion and have to be replaced. In regard to the operative treatment, the patient is prepared in the usual way for such an operation, and placed upon the operating-table in the lithotomy position. The sphincter is then slightly, gently and carefully dilated with the fingers, and the rectum irrigated with an antiseptic solution, usually bichloride of mercury, 1-3,000, followed by normal salt solution. Each anal quadrant is now grasped at the muco-cutaneous junction with a pair of T-forceps. These are held by an assistant. By means of these instruments the anus is everted and the internal tumors exposed. Seizing with the full hand the forceps attached to the posterior quadrant, fully evert it, and make pressure against the base of the hemorrhoid with the knuckle of the index finger, which places the mucous membrane covering it on a tension. Now, with a pair of scissors, sharply curved on the flat, remove an ellipse from the apex of the over-stretched covering of the hemorrhoid, commensurate with the size of the tumor. This opens the blood lakes and permits most of the blood in the tumor to escape. All of the angiomatous tissue is now carefully removed, when the remaining wall collapses. This leaves a very small area of denuded surface. Each quadrant in regular order is treated in like manner. A stream of hot sterilized salt solution of 115 to 125° F. flows over the field continuously during the operation. Spurting vessels, if there be any, are caught with a pair of forceps and thoroughly twisted. Should this fail to control the hemorrhage, throw a ligature around the vessel and ligate it. So far he has ligated bleeding points in three patients only, although he has done more than two hundred operations. The T-forceps are then removed, and all external tumors and tabs of skin cut off, care being taken not to make an incision in the muco-cutaneous junction, when it can be avoided, as this is the most sensitive point around the anus. This same precaution should also be observed when removing the internal tumors. The field is then dusted with some antiseptic powder, and a rubber-covered tampon introduced through a bivalve speculum. The tampon is allowed to protrude about 1.5 inches beyond the anal orifice. Gauze is carefully wrapped around the protruding portion and packed close to the anus. The anchoring string of the tampon is wrapped around a piece of gauze held close to one side of the tube, and woven in with the other dressings, so as to prevent the tampon from slipping into or out of the rectum. Over this is placed gauze, cotton, and a T-bandage, which is made quite taut. The patient is then placed in bed, and usually given a hypodermic of morphine, if not contraindicated. By operating in this manner there are no tender and obstructive stumps to slough, nor nerves caught and squeezed, producing excruciating pain, as there are when the ligature method is used; neither are the nerves and tissues painfully burned, as when the clamp and cautery are employed. In lieu of this there is a free and unobstructed outlet through the anus and a fibrinous exudate is deposited over the operative field, which exudate is neither destroyed nor disturbed by the removal of the dressings. Moreover, the danger of stricture is obviated, as the normal caliber of the bowel is left practically covered with mucosa and submucosa. The anal orifice is not contracted, as it necessarily is after either of the operations just mentioned. At the end of forty-eight hours the patient is given a cathartic and the tampon is re-

moved. Its removal is attended with ease and no pain. The movement of the bowels is usually painless, and there is, as a rule, little or no bleeding. From this time on, until convalescence is well established, the parts should be washed or irrigated twice a day with an antiseptic solution and dusted with some antiseptic powder. After the bowels have moved the patient is instructed to keep them soft for two or three weeks. Should the patient complain of pain or an aching sensation, a hot Sitz bath of twenty minutes' duration is given. As a detergent, small pieces of wet cotton or cottonoid are used. Paper and other hard or rough substances are interdicted. The rubber dressing is important, if not imperative, in this operation. There is but little or no pain during the first and subsequent movements of the bowels. This method of procedure, which the author has now employed in more than two hundred cases, in many of which local anesthesia was used, has been by far more satisfactory than any method previously used. It is very quickly and easily performed. Patients suffer little or no pain, as a rule, and they are out of bed in a week, and often in less time. In fact, it is not uncommon for them to resume their work on the fifth or sixth day after operation.

Fibroids of the Uterus and Broad Ligaments.—Dr. Edwin Ricketts of Cincinnati, Ohio, read a paper, by invitation, on this subject. Within the folds of one or both broad ligaments fibroids are occasionally found, but not so frequently as within the uterine tissue. It is claimed by some that fibroids always begin in the uterine zone, and if afterward found within the broad ligaments, it is by forcible extrusion into the same, due to the contractile force of the longitudinal and circular uterine muscle fibers. Uterine fibroids were divided into the submucous, intramuscular, subserous or subperitoneal. Uterine hemorrhage, in many instances, comes on as a result of the presence of fibromyomata situated under the mucous layer, or reaching that region as the result of pressure. The mucous membrane is less resistant than the muscular tissue to the mechanical action of the tumor. As a result, the tumor is expelled into the cavity of the uterus rather than into the abdominal cavity. In the subserous variety the muscular element of the uterus prevents advance of the tumor toward the mucous layer, and tends to cause a pedunculated protrusion into the abdominal cavity. Fibromyomata of the broad ligaments may be explained in several ways: (1) Expulsion from the uterine wall, with formation of the subserous variety from muscular contraction. (2) By tubal influence involving the retrograde expulsion and gravity. (3) Arterial origin. The arteries supplying the uterus and ovary traverse the broad ligaments and become tortuous and straight in turn, as the uterus becomes pregnant or later as it undergoes involution. The author said that there are numerous clinical facts which suggest to his mind that arteriosclerosis is a much more important etiological factor in uterine fibroids than is generally conceded. The great frequency of fibroids in the negro race, associated with the great prevalence of syphilis in the negro is especially suggestive, if the intimate relation of the latter disease to arteriosclerosis in general were considered. He had met with uterine fibroids in syphilitic subjects in a sufficient number of instances to impel him to more careful observations along this line in future. Specimens of uterine fibroids exhibited by numerous authorities have shown in many instances marked changes in the walls of the blood vessels. He called attention to four operative cases which covered the field of single fibroids. One weighed 65 pounds and was situated within the folds of the left broad ligament, the uterus being normal in size. The histology of this tumor showed it to be largely myomatous, indicating that it had been mechanically extruded early from the uterus to within the folds of the broad ligament. The same can be said of the other three cases, of 20, 16, and 8 pounds. The tissue in the case weighing 20 pounds was more distinctly fibrous in character. In one case of multiple fibroids (six small ones) recently removed by abdominal hysterectomy, menstruation had not been interrupted, but had been regular and without pain. Five of the growths were subserous. The sixth was submucous in character, the patient being forty-one years of age. Fortunately she had not been curetted. One case of fibroid of the fundus of seventeen years' duration, underwent cystic degeneration; the solid portion weighed 60 pounds, the fluid 38 pounds, in all 98.

Deep Transverse Arrest as an Indication for Forceps.—Dr. Charles B. Reed read a paper with this title. The "impacted" head is found low down in pelvis with sagittal suture parallel to transverse diameter of pelvis, fontanelles on about the same level and no tendency to forward rotation of occiput. Deep transverse arrest of the head was recognized 32 times in the last 3,600 labors at Chicago Lying-in Hospital, .9 per cent. According to Munch, the condition occurs in primiparæ in 81.61 per cent. of all cases and he believes it to be due to the early descent of head into pelvis. This unusual frequency in primiparæ is not borne out in the Chicago Lying-in Hospital statistics. Here 18 cases occurred in multiparæ and 14 in primiparæ. Flat pelves, the *too large* pelvis (47 per cent. of Ahlfeld's cases), exostoses of sacrum and symphysis, insufficiency of the powers of labor, pendulous abdomen and dolichocephalous are also of etiological importance. The diagnosis is readily made by vaginal examination. The danger to mother and child arises from the great prolongation of the labor and the consequent evils—sepsis, fistulæ, necrosis, hemorrhage, etc. Cases are treated either by position on side, by manual correction or by forceps. In the Chicago Lying-in Hospital service, the maternal condition furnished the most frequent indication to terminate the labor. Forceps were applied 23 times; head spontaneously rotated 9 times. Forceps applied in that oblique diameter of pelvis which corresponds to the position of occiput. Head is grasped by anterior malar bone and posteroparietal eminence. Two objects are to be secured, rotation and extraction, and these must be simultaneous. *Conclusions:* Deep transverse arrest of the head is a relatively common complication of labor. Diagnosis is easily made from position of fontanelles and sutures. Normal termination of case can not be awaited in most instances, but forceps should be applied as soon as it is evident that rotation will not occur spontaneously. Location of occiput must be determined before forceps are applied. Blades must be applied in that oblique diameter toward which the occiput lies. Traction and rotation must be simultaneous.

CANADA.

A Medical Editor Resigns.—It is understood that Dr. H. B. Anderson, Editor-in-Chief of the *Canada Lancet*, has tendered his resignation.

Personals.—Dr. Harry W. Spence, last year house surgeon at the Toronto General Hospital, has received an appointment from the British Government as medical officer for one of the concentration camps in Natal.—Dr. R. A. Reeve, Dean of the Medical Faculty of Toronto University, is to receive the honorary degree of Doctor of Laws at the June Convocation.—Dr. Adam H. Wright, Editor-in-Chief of the *Canadian Practitioner and Review* is spending a holiday at Atlantic City.—Dr. Dryer has been appointed on the staff of the Vancouver, B. C., City Hospital.—Dr. Rose, who has been house physician at the St. Boniface Hospital at Winni-

peg for the past twelve months, has resigned to commence practice at Gladstone, Manitoba.—Dr. James F. W. Ross has returned to Toronto from a two months' holiday in the Bahamas.—Dr. James Stewart, Professor of Medicine and of Clinical Medicine at McGill University, Montreal, has been elected President of the Association of American Physicians.—The authorities of the Toronto General Hospital have decided to place a woman doctor on the regular visiting staff, and also to appoint two women doctors as registrars.

Winnipeg General Hospital.—For the week ending April 26, the Winnipeg General Hospital treated 218 patients. Of this number 133 were men, 58 women and 27 children.

Order for Compulsory Vaccination.—The Board of Health of the Province of Quebec has once more called upon the city of Montreal to immediately enact a by-law providing for obligatory vaccination, failing to do which they will compel a heavy fine. One of the aldermen of the city has one in readiness which will be brought before the Council at its next meeting.

Western University at London.—The results of the term examinations in medicine at the medical department of the Western University were posted May Day. Fifteen young men will thus be let loose to swell the ranks of the medical profession in this province of Ontario.

Dalhousie University, Halifax.—The annual commencement exercises of the University at Halifax, Nova Scotia, were held on the afternoon of April 29th, when twenty-one received the degree of M.D., C.M., the largest graduating class in the history of this University. The final gold medalist was Mr. S. A. Fulton of Truro; the primary, Mr. A. R. Cunningham of Dartmouth.

Two New Consumption Sanatoria.—As a result of the recent conference on tuberculosis, held at Ottawa, it is announced that two wealthy Canadians will build at their individual expense, two new sanatoria for the treatment of consumptives. Sir William Macdonald will donate one to be erected near Montreal; while the newly-elected President of the Canadian Asociation for the Prevention of Tuberculosis, Mr. W. C. Edwards, M.P., will present another which will be located near Ottawa.

Shutting Out Diseased Immigrants.—Legislation is at the present time before the Canadian House of Commons which will amend the Immigration Act. As originally drafted this amendment simply gave the Governor-General power to prohibit by proclamation or order the landing of persons in Canada, suffering from dangerous or infectious diseases. Now, in addition, a further clause will be added to the effect that "Such prohibition may be absolute or may be accompanied by permission to land for medical treatment only, for a period that may be determined by the order or proclamation."

Samaritan Free Hospital, Montreal.—According to the report presented at the annual meeting of the managers of The Samaritan Free Hospital for Women at Montreal, held last week, there were treated in the institution during the past hospital year 133 patients, an increase of 20 over the previous year. In the outdoor department over two hundred received advice and remedies. The deaths number 5 for the year, a decrease in comparison with the previous year. The receipts reached $3,733.74, while the expenditure amounted to $3,149.75.

GENERAL.

International Association of Railway Surgeons.—The fifteenth annual meeting of this Association was held in St. Louis, Mo., April 30th, May 1st and 2d, under the presidency of Dr. Rhett Goode, of Mobile, Alabama. Several papers were read and discussed. The following officers were elected for the ensuing year: President, A. W. McCandless, St. Louis, Mo.; Vice-Presidents, A. L. Wright, Carroll, Iowa; J. B. Rule, St. Louis, Mo.; J. C. Wysor, Norfolk, Va.; E. E. Kitchener, Canada; W. G. Jamieson, Texas; R. Ortego, Mexico, and P. Dougherty, Kansas. D. S. Fairchild, Clinton, Iowa; A. I. Bouffleur, Chicago, and J. R. Hollowbush, Rock Island, Ill., were elcted members of the Executive Board. Indianapolis, Indiana, was selected as the place for holding the next annual meeting.

San Francisco Board of Health.—*Whereas*, The Mayor of the city of San Francisco has seen fit to remove the so-called old Board of Health, and *Whereas*, The Chief Executive of the city has stated that he has determined after a prolonged personal investigation that bubonic plague has never existed in San Francisco, and *Whereas*, The position is absolutely unsupported by any competent, unprejudiced physician who has made personal examination of suspects or alleged cases of plague before or after death, or who has examined the bacteriological evidence presented, and is further in direct conflict with the findings of the Federal Government Experts and Special Commission, therefore be it, *Resolved*, That the Medical Society of the State of California emphatically condemns this action on the part of the Mayor of San Francisco and at the same time endorses the position always maintained by the old Board of Health in its sanitary defense of the people of the city of San Francisco and of the country at large.

Medical Society of the State of California.—This Society met in annual session April 15, 16, and 17, and elected the following officers for the ensuing year: President, F. B. Carpenter, San Francisco; First Vice-President, C. C. Wadsworth, San Francisco; Secretary, George H. Evans, San Francisco; Treasurer, E. E. Kelly, San Francisco; Board of Examiners, Dudley Tait, David Powell, D. E. Osborne, W. S. Thorne, R. L. Wilbur.

McKinley's Physicians.—Congress will pay the funeral expenses of President McKinley, including the physicians' bills, over which there has been so much contention. An item is to be inserted in the Urgent Deficiency Bill, now under consideration by the House Committee on Appropriations, which provides for an appropriation of $50,000 to defray the expenses attending the death and burial of the President. It is understood that an agreement has been reached whereby $31,000 of the amount appropriated shall go to the physicians and the remainder will be used to defray the funeral expenses. Friends of the dead President and others interested have been consulted, and it is believed that the allowance will be entirely satisfactory to all concerned. Statements of all the expenses incurred were submitted to the Committee, and the amount named will cover all obligations of the Government.

American Orthopedic Association.—The next annual meeting of this association will take place in Philadelphia, June 5, 6, 7, 1902. An unusually full and attractive program is announced.

Prize Essay on the Dangers from Self-drugging with Proprietary Medicines.—The Colorado State Medical Society offers a prize of twenty-five dollars for the best essay, for circulation among the laity, upon the dangers of self-drugging with proprietary medicines. The competition is open to all. Essays must be typewritten in the English language, must contain not more than 3,000 words, and must be submitted before June 15, 1902. Each essay must be designated by a motto and accompanied by a sealed envelope, bearing the same motto and enclosing the name and address of the author. The essay receiving the prize will become the property of the Society for publication. Others will be returned to their authors. Essays should be sent to the Litera-

ture Committee. Dr. C. A. Graham, Sec'y, Stedman Block, Denver, Colorado.

St. Louis Medical Society of Missouri.—At the meeting held May 3d, Dr. R. B. H. Gradwohl read a paper entitled "The Bacteriologic Findings in a Fatal Case of Tetanus Complicating Vaccinia."

Tri-State Medical Society.—The fourteenth annual meeting of the Tri-State Medical Society will be held at Birmingham, Ala., October 8, 9 and 10, 1902. This meeting promises to be of unusual interest from present indications. One of the prominent features of the last meeting and which attracted considerable attention was the discussion of sociological questions. The papers in this section excited considerable comment locally and in many of the journals throughout the country.

Abolition of the Newspaper Publication of Personal Medical Advertisements.—A paper read by Dr. J. W. Kyger before the Kansas City Academy of Medicine on "The Decadence of the American Race" was deemed of sufficient importance to warrant the appointment of a committee to draft resolutions expressing the feeling of the regular medical profession in regard to the abatement of one of the causes of this condition, and also asking for the coöperation of the profession throughout the United States. *Whereas,* It can and has been shown, by ample statistics, that the American race is rapidly decreasing in its birth-rate, thereby threatening ultimate and complete decadence of the race, and *Whereas,* Such decadence has become so apparent that it should claim the serious attention of those of influence and power to in any degree lessen this evil, and *Whereas,* Without a special effort to investigate, it must have been observed by the most indifferent with what flagrant violation of all sense of delicacy the public press gives place to advertisements of nostrums and means intended to prevent or cut short pregnancy; these advertisements appearing in a column of the paper set apart for such purpose under the name of "Personal Medical Advertisements," and referred to as "Guarantees," "Sure Relief," "Sure Prevention," etc., occupying in some Sunday editions of reputable papers as much as two columns, destined to fall into the hands of all classes, and *Whereas,* We recognize the press as a most potent factor in the education of the masses; be it *Resolved,* By the Academy of Medicine of Kansas City, Mo., that we respectfully recommend that a censorship over the public press should be exercised to the end of correcting such practice of publishing advertisements as those referred to in the foregoing. Be it further *Resolved,* That it should be deemed of sufficient moment for the attention of the Post Office Department of the United States of America restricting or prohibiting the distribution of such papers, periodicals or magazines through the United States mail, to be called to the matter, if they continue to so prostitute their columns with such matter. And be it further *Resolved,* That a copy of these resolutions be sent to every State Medical Association in the United States, urging their coöperation in this movement by the adoption of these resolutions. *Resolved,* That we request the Secretary of every State Medical Association adopting these resolutions to forward two copies, one to the American Medical Association and the other to the Post-master General petitioning for relief from this destructive influence.

Obituary.—Dr. John Homans, second, one of the most eminent physicians in Boston, died May 4th at his residence on Newbury street, at the age of forty-five.

Dr. Joseph P. Turner, one of the oldest of the alumni of the University of Pennsylvania, died recently in Trenton, aged seventy-nine years. He has held several municipal offices in Trenton and was an active Democratic orator. He was in the cavalry service in the Civil War. He had been in practice for more than fifty years.

Dr. Charles H. Masten, one of the best-known physicians in Rockland County, died at his home in Nyack recently of pneumonia, after an illness of ten days. He was in his sixty-third year and unmarried. Dr. Masten was born in Odell town, Province of Quebec, Canada, August 21, 1839, and came to New York when about thirty years old. He studied medicine in Bellevue Medical College and after graduation settled in Rockland County.

CORRESPONDENCE.

THE LAY PRESS AND MEDICINE.

To the Editor of the MEDICAL NEWS:

DEAR SIR—As we have always desired to avoid extra-medical publicity, we would ask you to publish the following statement:

On April 19th there appeared in the *Medical Record* an account of some experimental work that we had done with regard to the transmission of light through the human body. This seems to have excited the curiosity of a daily paper of this city; but when its representatives came to see us we absolutely refused to be interviewed or quoted in any way. Knowing the methods of contemporaneous journalism, however, we were careful to point out to the reporter that the experiments had no public interest and that no claims of therapeutic results were made in the article. We refused to give the pictures for publication, or to allow the newspaper men to use the machine to make others; and we warned the manufacturers upon the subject.

It seems, however, that the newspaper in question had other relations with the manufacturers, and they succeeded in getting the use of a machine at the factory and repeated the experiments. The results were the postal cards sent to the profession last week and the article in the *World* of Sunday, May 4th.

We desire to disclaim all responsibility in the matter and more especially for the therapeutic statements and hints that it contains. On this latter subject we said in the *Record*, "The proof of the penetration of actinic light to and through the internal organs apparently opens a field for its successful employment as a therapeutic agent in their maladies in view of its admitted efficacy in a number of dermatoses." Upon this conservative and provisional basis the whole newspaper superstructure was raised.

It seems impossible to avoid undesirable publicity when the public journals think that a subject can be strikingly exploited.

WILLIAM S. GOTTHEIL, M.D.,
MILTON W. FRANKLIN, M.D.

New York, May 5, 1902.

TRANSACTIONS OF FOREIGN SOCIETIES.

French.

RED BLOOD-CELLS AND ELECTRICITY—THE COMBINED PRODUCTION OF INDOXYL AND UREA—FATTY ACIDS AND DRINKING-WATER—FATAL CHLOROFORM NARCOSIS—FIBROMA AND SPASM OF THE PYLORUS—HEMODIAGNOSIS OF HYDATID CYSTS—LACTATE OF MERCURY—CEREBRAL RHEUMATISM.

GALUGAREANU and HENRI, at the Academy of Sciences, February 24, 1902, read a paper on the resistance of red blood-cells determined by their conductibility of electricity. As a rule the resistance of the blood-cells is measured by studying the diffusion of the hemoglobin in a mixture of blood and a liquid, isotonic or hypertonic. The authorities raise the question in their own minds whether under these conditions the salts contained in the blood-cells diffuse with the same facility

as their coloring matter. For this purpose they washed the red blood-cells with solutions of pure saccharose of a strength of from 56 to 70 per cent. Normally these solutions offer very high resistance to the passage of electric currents, but after they have been used to wash the red blood-cells their conductibility of electricity is noted to have increased to a very large degree. This could hardly hold unless the diffusion of the salts contained in the elements in question had taken place and this especially in the absence of all solutions of hemoglobin. It therefore appears that in the study of the resistance of the red blood-cells, it is necessary to determine not only the manner in which their coloring matter behaves, but also what becomes of the salts which make part of these elements.

J. GNEZDA, addressed a note to the Society in which he established the fact that one can observe in certain morbid symptoms independent of all processes of putrefaction within the intestines (mental depression, diabetes, scarlet fever, measles, etc.,) the production of an excess of urea and proportionately of indoxyl within the urine. This determination makes it possible to admit that there exists within the organism a source of indoxyl of a non-bacterial origin, resulting without doubt from the oxidation of an indoxylic group derived from the albuminoid molecule. This oxidation is allied to the formation, at the same time, of a certain quantity of urea.

H. GAUSSE contributed a communication on the significance of the presence of fatty acids in drinking-water. The amount of these acids in water was determined by means of a process based upon the insolubility of the barytic elements of these acids. The proportion of fatty acids in drinking-water usually varies according to the season from 0.00001 grams to 0.0001 grams to a liter. These substances are not available themselves, but they indicate a contamination of water because they proceed at once by direct route or by filtration from the waters of sewers or stables or the refuse of certain industries.

BAZY, at the Surgical Society, February 26, 1902, continued the discussion of the subject of chloroform narcosis which was held over from the symposium of the last two meetings. He said that the existence of lesions of the heart valves does not constitute a contraindication to the use of chloroform. He has had numerous occasions to operate on patients afflicted with valvular lesions and in them the use of chloroform caused no trouble. On the other hand a myocarditis presented a much more important disease. Without wishing to deny the existence of reflex symptoms and sudden heart-failure due to chloroform itself, he says there exists with regard to this anesthetic, as with regard to all potent medicines, wide variations of individual susceptibility. Moty has reported only one death due directly to chloroform, but notwithstanding this good record, he is afraid of this anesthetic and considers that whenever possible it is wiser to employ local anesthesia by means of cocaine. Guinard said he believed that the subjects of heart disease could be put under chloroform, but if one were to take account of all the restrictions put upon this subject it would be only in those cases in which the valvular lesions were fully compensated in the circulation that chloroform could be used with no less danger than in persons of perfectly good health. Broca said that in one of his cases of fatal chloroform narcosis, which he reported at the last meeting, at the autopsy the thymus gland was found hypertrophied. Michaux expressed astonishment that in all the discussions previously held on this subject no one had mentioned rhythmic traction on the tongue which he has seen repeatedly do good work in bringing a person out of too deep chloroform narcosis. Poirier places great confidence upon artificial respiration without traction on the tongue.

The last speaker continued with a report of an interesting gastric case. The patient was a woman who entered the hospital with a diagnosis of cancer of the stomach at the pylorus. He made an exploratory laparotomy which did not show any tumor of appreciable size at this point or in the duodenum, or in the liver. The cause of the trouble was a spasm of the pylorus. On the anterior aspect of the pylorus he found a small elevation the size of a small nut, which he removed. Histological examination showed that it was a pure fibroma. Recovery followed.

TUFFIER reported in the name of Millian and himself the fact that they had found peculiar changes in the blood, apparently caused by hydatid cysts, partaking chiefly of the nature of eosinophilia. It seems possible that the parasite itself caused these reactions. In only one case among twelve have they been in error after an examination of the blood. After the establishment of the eosinophilia they made the diagnosis of hydatid cysts. There existed in reality myxoma.

GAUCHER, at the Medical Society of the Hospitals, February 28, 1900, said that, according to his researches, of all the soluble salts of this metal, the neutral lactate of mercury is the one to which preference should be given, because of its great solubility and because it can be preserved almost indefinitely in solution, and because it is free from any irritating reaction and is very rich in mercury, more so than the benzoate. It may be given by the mouth in daily doses of four teaspoonfuls of a solution of 1 per cent., preferably in a little sweetened water, or by subcutaneous injection of 1 c.c. of a 1-per-cent. solution daily. His verdict is that this neutral lactate of mercury may be substituted for all other solutions of mercury in the treatment of syphilis.

TERRIER communicated an observation on a soldier who was severely attacked in the course of an acute articular rheumatism with a violent pain in the head, delirium, convulsions and a decrease of the pain in the joints at the same time. Death followed during the night of the same day on which these symptoms appeared. A puncture in the spinal cord a few hours before death brought a strong jet of clear fluid, which, after centrifuging, produced only a slight deposit of white blood-cells. All efforts to find bacteria in this fluid were futile. At the autopsy there were no lesions of the meninges or the brain. The only peculiarity which seemed to characterize this case of cerebral rheumatism was the high tension of the cephalorachidian fluid.

BYWAYS OF MEDICAL LITERATURE.

PRELIMINARY EXAMINATIONS FOR MARRIAGE.

WE may be prone to think that it is only in these latter days and perhaps in the distant West that the suggestion for the advisability of preliminary examinations before marriage in order to decide as to the suitability of the parties for the contraction of matrimony was made. As a matter of fact, however, this idea has long been in the minds of sociologists bent on the improvement of the race. The following curious passage occurs in the "Utopia" of Sir Thomas More, the English Chancellor, who was put to death by Henry VIII. It was written in the very early part of the sixteenth century.

"In choosing their wives they (the supposed inhabitants of Utopia) use a method that would appear to us very absurd and ridiculous, but it is constantly observed among them, and is accounted perfectly consistent with wisdom. Before marriage some grave matron presents the bride naked, whether she is a virgin

or a widow, to the bridegroom, and after that some grave man presents the bridegroom naked to the bride. We, indeed, both laughed at this and condemned it as very indecent. But they, on the other hand, wondered at the folly of the men of all other nations who, if they are but to buy a horse of a small value, are so cautious that they will see every part of him and take off both his saddle and all his other tackle, that there may be no ulcer hidden under any of them, and yet, in the choice of a wife, on which depends the happiness or unhappiness of the rest of his life, should venture upon trust and only see about a hand's breadth of the face, all the rest of the body being covered, under which may lie hid what may be contagious as well as loathsome. All men are not so wise as to choose a woman only for her good qualities, and even wise men consider the body as that which adds not a little to the mind, and it is certain that there may be some such deformity covered with clothes as may totally alienate a man from his wife when it is too late to part with her. If such a thing is discovered after marriage, a man has no remedy but patience. They, therefore, think it is reasonable that there should be good provision made against such mischevous frauds. There was so much the more reason for them to make a regulation in this matter, because they are the only people in these parts that neither allow of polygamy nor of divorces."

This method may be commended to the attention of Western law-makers whose zeal for race progress outruns their ethical sense. There is but one difficulty Edmund Clarence Stedman, the poet and critic, said not long ago that the writing of blank verse was like standing nude for inspection, "only very few can stand the test." This test might limit even more than at present the number of marriages, an eminently undesirable consummation not at all to be wished for, especially with the already low and lowering birth-rate in this country.

Dangerous Family Remedies.

In the "Bits of Common Sense Series" by Marian Harlan, one of the little volumes is on "Health Topics." Most of the advice given is excellent. Her position with regard to patent medicines is especially interesting, because of the thorough-going common sense displayed. Some of the maxims with regard to the sick-room, as "Don't mix medicine in the sight of the one who is to take it" and "Don't whisper in a sick-room, even when the patient is presumably asleep or in a stupor," "Don't wear rustling gowns in a sick-room," "Don't discuss symptoms in the hearing of the sufferer" are especially suggestive. Here is a paragraph that might well be read by every physician to anxious friends on his first visit to a patient: "Avoid asking the patient often, 'How are you feeling now?' A friend, who had passed through two years of trying invalidism said to me once with a nervous laugh after her devoted husband had left the room, 'Do you know, that was the fifty-ninth time he has asked me to-day 'How are you now, my love?' If he puts the question sixty times, I *must* scream!'"

There are some things, however, that are not quite so worthy of approbation. For instance with regard to the family medicine-chest, the writer says: "The sensible mother will stock her medicine shelves so intelligently that she will be surprised at the scantiness of the store. If she be allopathic, paregoric, ipecac, rhubarb, aconite and chlorate of potash will carry her through ordinary cases of illness. When these do not meet the demand it is time to send for a physician. The homeopathist with pulsatilla, coffee, mercurius and spongia may consider herself well equipped."

So far as the so-called allopathic drugs are concerned there are at least two of those recommended as seemngly harmless that medical men would not like to see in a family medicine-chest, nor think of as being used without very careful directions in children's ailments. Aconite and chlorate of potash are both of them too dangerous to be handled, especially in cases of children's illnesses, by anyone but a physician. Most physicians would also object to the free use of paregoric. Aconite, of course, is a dangerously poisonous drug and well known as such. Chlorate of potash has become of late years a popular medicament. That it can be used with impunity is an entirely mistaken notion. Many serious cases of nephritic irritation have resulted from its too liberal employment. When kidney disease already exists, it is almost criminal to use it in any quantities. Certain individuals seem to have an idiosyncrasy for it, which makes even small doses dangerous.

Possibilities in Health Adaptation.

In the course of the present Balzac revival a number of interesting details from the private life of the great French writer are finding their way into print. He was not infrequently accustomed to lock himself up in his room for as many as twenty or thirty days at a time, seeing no one and keeping the curtains closed and the lights continually burning even in broad daylight. The only human being he would see at such times was his servant for whom he rang when he felt the need of food. This he washed down with numerous cups of coffee. A writer in the February number of the "Bookman" gives some details of Balzac's appetite when, after a writing bout such as described, he permitted himself to indulge in the pleasures of the table.

"His capacity was Gargantuan, as may be judged by this menu of a dinner he once ordered at Véry's for himself alone: One hundred Ostend oysters, twelve mutton cutlets, a duck, a pair of roast partridges, a sole à la Normande, without counting the hors d'œuvres, side-dishes and fruits, among which were some Doyenne pears which he swallowed by the dozen and fine wines, coffee and liquors."

Balzac must certainly have been as great a gastric genius as he was an intellectual one to stand all that and survive.

Nurses and Susceptible Convalescents.

The recent revival of "The Notorious Mrs. Ebbsmith" by Mrs. Campbell brought the subject of the trained nurse and her influence over the mind of convalescent patients once more to the fore. The "New York Sun" had a recent article on the question, some passages of which seem worth quoting. "'Isolde was the great original trained nurse,' remarked a woman coming out of the Opera House last Saturday afternoon. 'That little episode between her and Tristan that Wagner takes four hours to tell us about is the first trained nurse flirtation on record. If you have studied your libretto carefully, you will recall how Isolde, a past mistress in the art of healing, first won Tristan's affection by nursing him back to life after a serious wound. The two are finally brought together again just before death, which in their case, as presented by Wagner, may be literally called lingering, by Isolde's ability as a nurse. Of course, the case is idealized and immortalized by the great musician dramatist, but the elemental conditions are the same. I wonder how Wagner, by the way, would have treated a case I know, where the son being very susceptible and having fallen ill of typhoid fever, the father in engaging a nurse requested the hospital authorities to pick out one just as homely and unattractive as possible. The specimen that presented herself according to these in-

structions was worse than the father's fondest hopes had imagined. But, alas, the father had failed to gauge the son's susceptibility. In spite of everything, the boy fell in love with the nurse and as soon as he was well he insisted upon marrying her. And now the father mourns that he did not tell them to pick out the youngest and prettiest nurse they had. Whatever she was, the boy was bound to fall in love with her, it seems, and she might just as well have been attractive as unattractive.'"

We hope that this will prove a proper warning to anxious parents not to interfere any more than they can possibly help with the inevitable designs of the Providence that rules over matrimony. Dan Cupid will not be foiled and the only course open to reasonable relatives is to submit gracefully. We hope, too, that this will serve to remove some of the prejudice against attractive nurses that at one time threatened to impair seriously the income of the unfortunately too fair members of the nursing profession.

WORK AND SUFFERING.

We spoke in a recent instalment of "The Byways" of the therapeutic effect of such a book as Stevenson's "Autobiography," with its lessons of patient endurance of sickness and pain in the midst of work that would seem more than enough for the same length of life in a healthy man. Another such therapeutic book has recently appeared in the volume of letters of John Richard Green which has just been issued under the distinguished editorship of Mr. Leslie Stephen (Macmillan & Co.). The work is more than a mere collection of letters; it is so designed with connecting links and skilfully interpolated narrative that it accomplishes all the purposes of a biography. Green was born in 1837 and died in 1883 at the comparatively early age of forty-six. As men go in literature and history he was a young man. Nearly all his life he had been an invalid, yet the volume of work accomplished by him in the midst of his invalidism may fairly be described as prodigious. A list of his works fills two pages exclusive of translation, magazine articles and some eight score contributions to the "Saturday Review" in its palmy days. "His histories alone," says a reviewer in the "Contemporary Review" of January, 1902, "might well have engaged the full energy of a stronger man. But, like Stevenson, he was invincibly brave in illness and an incessant worker." In the midst of so many delays in his work from illness of various kinds, there were occasional fits of depression, but the prevailing note of his letters is that of supreme cheerfulness. The majority of the letters are written to personal friends and we might have expected to have had more airing of his personal suffering, but there is very little of this. The book ought to prove an excellent stimulant tonic in depression to those who have so much less reason for downcast feelings than had Green or Stevenson in the midst of their work.

SOCIETY PROCEEDINGS.

AMERICAN ASSOCIATION OF GENITO-URINARY SURGEONS.

The Sixteenth Annual Meeting, Held at Atlantic City, April 29 and 30, 1902.

FIRST DAY—APRIL 29TH.

Technic of Prostatectomy.—Dr. John P. Bryson of St. Louis described the technic as follows: After the usual preliminary preparations a broad, grooved staff is introduced and a free perineal incision made, opening the urethra just in front of the apex of the prostate. The knife, after entering the groove of the staff, is pushed far enough back to incise the ring at the apex of the prostate. The forefinger follows well into the prostatic urethra and the staff is withdrawn. The finger quickly exposes the prostatic urethra and ascertains whether the vesical outlet can be reached; after which the forefinger of the right hand in the rectum permits a bimanual examination of the prostate within reach. Guided by the finger a blunt instrument is passed into the urethra and made to puncture the most prominent part of the mass from the urethral side, and the instrument is pushed well into the swelling. On its withdrawal the finger tears its way into the center of the mass which, even in fibrous prostates, is comparatively friable. The mass is opened through to its capsule and the finger swept round its periphery without tearing the prostatic capsule or fibrous sheath of the gland. The floor is felt to tear longitudinally. After the lobe has been loosened all around there remains the attachment to the urethra in detaching which care must be taken not to remove too much of the sides nor any of the roof of the urethra. The hypertrophied lateral lobe is removed, to do which one has often to go well up behind and beside the neck of the bladder; yet it is possible to do this and keep within the capsule. Very little bleeding follows. The detached mass may be delivered with ordinary lithotomy forceps, or it may be broken up with the finger or divided with scissors. This process is repeated on the opposite side, after which a median posterior segment remains to be dealt with, which can usually be done by sweeping the finger from side to side, pushing it backward in such a way as to detach it well up behind the bladder and roll it downward. One may often be surprised to find that one can enucleate what one has just felt as a pedunculated intravesicular projection or a growth *en collerette*, bringing it well down by use of the forceps apparently without disturbing the fibrous ring at the vesical outlet. The more the detached mass is rolled downward by pulling upon its upper surface the less mucous membrane is removed. Usually the finger may be passed through the ring into the bladder which may be explored thoroughly. The bladder is then irrigated with hot saline solution until the oozing ceases. If the finger be introduced, the floor and the sides of the urethra will be found intact, the latter often hanging loosely against the outer wall or sides of the cavity from which the growths have been removed. A large cavity is made out between the lower part of which and the rectum there is felt a thin wall. Into the lower part of this, hinged posteriorly about the ring at the vesical neck, is an irregular flap of mucous membrane, which can be pushed back and often made to occlude the vesical outlet. Care must be taken not to double backward and push this flap into the bladder when the large drainage tube is introduced.

Surgical Relief of Prostatic Hypertrophy.—Dr. Charles H. Chetwood of New York read this paper. The following conclusions were reached: Palliative measures should not be persisted in when they fail, after reasonable duration, to produce and maintain an abatement of symptoms. A first infection of the bladder is not sufficient excuse for operation unless palliative measures fail to subdue promptly inflammatory conditions. Recurring infection of the bladder or ascending infection of the kidney is sufficient warrant for operative interference. There is a growing tendency toward earlier operation than was formerly practised. The greater number of cases of prostatic hypertrophy can be satisfactorily reached through a perineal incision. In the large majority of cases, the requirements of an operation upon the prostate consist in the removal of the obstructive area and depressing the bladder opening

into the prostate, so that the *bas fond* may be properly drained. In many cases the obstructing area of the hypertrophied gland can be satisfactorily removed through a perineal opening by means of the galvano-caustic incisions. Perineal galvanoprostatotomy is preferable to the Bottini operation on account of its greater accuracy and lower mortality.

Bottini Operation.—Dr. Henry H. Morton of Brooklyn reported a case in which this operation had been performed on a patient seventy-eight years of age, who for one year prior to the operation had been complaining of tenesmus and frequent and painful urination. At the time of his admission to the hospital there was complete retention. An examination revealed twenty-four ounces of residual urine. At this time the prostate was 1½ inches in diameter and cystoscopic examination showed an enlarged middle lobe and trabeculated bladder. The urine was acid, cloudy, with a specific gravity of 1016, and showed a slight sediment which contained pus-cells but no casts. Bottini's operation was performed, three incisions being made, the anterior one being 2 cm., the posterior 3 cm. and the left lateral 2 cm. in length. For three days after the operation catheterization was necessary, at which time the patient began to urinate spontaneously. Eleven days after the operation micturition occurred every hour during the day and five times at night, catheterization being performed daily with a withdrawal of from three to four ounces of residual urine. One month after the operation the patient urinated six times daily and four times during the night, the stream, although slow in starting, being ejected with good force. Up to this time the patient continued to be in good general condition and cystoscopic examination showed the posterior lobe of the prostate with a cleft in the middle made by the Bottini incision. Subsequently the patient's appetite and general vitality began to decrease and death ensued fifty-four days after the operation. A complete autopsy was not permitted, but an examination of the bladder showed it to be contracted and to contain a small quantity of thick and foul pus. Many small necrotic areas were scattered about the surface and a number of small sacculi, one containing a little calculus, were observed. Traces of the posterior incision were very distinct. The interureteric fold of the mucous membrane had been divided, and the middle lobe of the prostate cleft in halves, necrotic areas being visible at the apex of each half. The left lateral incision had not split the prostate, but merely separated the mucous membrane from the superior surface of the prostate, and no traces of the anterior incision were visible. The kidneys were not examined, but, as previous urinalyses had revealed the absence of casts, the cause of death was probably cystitis, which had been greatly aggravated by the operation. The middle lobe of the prostate was completely divided into two halves. The reduction in size of the prostate following Bottini's operation probably results from the sloughing subsequent to the burning. The difficulties of placing the instrument in a correct position are shown by the fact that the left lateral incision did not divide the left lobe of the prostate, as intended, but only lifted up the mucous membrane covering it, while the anterior incision was found not to be made at all. The obstruction to urination was relieved by a single incision through the posterior median lobe of the prostate, and death did not occur until seven weeks after the operation, at which time the relief was complete. The patient required bladder washing and had no home, and for these reasons was kept in the hospital until his death; had he left the hospital as soon as he was able to go after the operation, his case might have been reported as one of complete retention of urine in a man seventy-eight years of age entirely cured by Bottini's operation.

Prostatectomy.—The same author reported a prostatectomy performed on a patient aged sixty-two years, who entered the hospital suffering from retention of urine due to prostatic enlargement. Previous to his admission attempts to introduce a catheter had resulted in a false passage into the prostate. At the time of his admission no instrument would be passed into the bladder, and external urethrotomy without a guide was performed. For three weeks subsequent to this the bladder was drained through a No. 30 catheter, at which time it was removed, but, owing to the fact that the patient could not urinate, it was reintroduced and allowed to remain two weeks longer, when a prostatectomy was performed. Suprapubic cystotomy to depress and hold the prostate was performed and the perineal wound was used for shelling the prostate out from the capsule. Three tumors, from ½ to 1½ inches in diameter, were enucleated without difficulty, and no hemorrhage followed the operation. Drainage was established through perineal and suprapubic tubes. The patient did well for three days and the drainage was perfect, but later sepsis developed and ten days after the operation death ensued. The autopsy showed the suprapubic wound to be intensely infected; the cavity from which the prostatic tumors had been removed was healthy in appearance and indicated that it would have healed entirely by granulation. The obstruction to urination had been entirely relieved by the enucleation of the prostatic tumors.

Removal of all Three Lobes of the Prostate by Suprapubic Cystotomy.—Dr. Charles L. Gibson of New York presented this specimen which was removed from a patient sixty-two years old, who gave a history of increasing obstruction of urine for the past six years. Urine frequently dribbled away. Examination *per rectum* revealed both lateral lobes enlarged. On several occasions fifteen ounces of residual urine were obtained. Moderate cystitis. No kidney lesion was evident. Prostatectomy by the Alexander technic was undertaken, but the first step revealed the bulging of the prostate into the lumen of the bladder so distinctly that he determined to remove the enlarged portions by this direct approach. The vesical mucous membrane was incised over the urethral orifice and he then found that his finger could sweep easily all around the prostate; so, in a few seconds he brought out the whole prostate *en masse*. The urethral outlet must have been avulsed, but of this he was not aware, so the prostate was simply shelled out without any force and without any bleeding. The operation was completed by adding a perineal boutonnière for drainage. Four days after operation the dressings were changed and the bladder was washed out; the patient's condition appeared to be good, the temperature was normal, and there was a free secretion of urine. Six hours later the patient died without any particular manifestations. No autopsy. He presented the case, not to recommend that the prostate should be removed *in toto* with the necessary drawback of destroying the urethral outlet, but for the purpose of emphasizing how easily the prostate, or portions of it, can be removed without destruction of tissue or hemorrhage provided one clearly enters the essential line of cleavage.

Dr. Eugene Fuller of New York had performed twelve perineal prostatectomies during the past year and a half, with but one death, which resulted from delirium tremens. The oldest patient was eighty-one years old and his condition was complicated by the presence of a mulberry calculus which he had to remove by the suprapubic route. Another of his patients had

tuberculosis of one lung and spinal anesthesia was administered successfully. The patient died of general tuberculosis seven or eight months after the operation.

Dr. Francis S. Watson of Boston said that two-thirds of all cases of prostatic enlargement would be found within reach of the finger after a perineal incision through the urethra. An elaborate armamentarium he did not believe to be necessary, and he laid particular emphasis upon the use of the finger in removing this gland.

Dr. George Chismore of San Francisco had had an opportunity of observing the work of Dr. Goodfellow of San Francisco whose method he described. Especial importance was placed upon putting the patient in a position with the thighs strongly flexed upon the chest. He reported eight cases, all bad ones, occurring in old men, two of them being over eighty years of age. Of this number two died. In one of these there was an encysted stone and a suprapubic opening was necessary to remove it, although it was not larger than the end of one's thumb. The second patient died partly as the result of an opening made into the rectum during the operation.

Operative Treatment of Hypertrophied Prostate, with Presentation of Specimens and Models Illustrative of that Condition.—Dr. Bransford Lewis of St. Louis said that while claiming for prostatic surgery the merit of wonderful progress in the last fifteen years, he thought that the profession was not above criticism in certain respects; that operators were much inclined to follow beaten tracts and routine procedures rather than base their operative treatment on the special conditions found in each individual case. He mentioned some points in the histories of some of his cases which had a bearing on the subject. The practical lessons derived from these cases were that the proper selection of the operative procedure is of the greatest importance in attaining successful results. This was satisfactorily explained by the dozen or more pathological specimens and models of hypertrophied prostates exhibited by him. In these the various forms of prostatic enlargement and obstruction were clearly illustrated—the prostatic bar, the bilateral hypertrophy, the intravesical tumors and projections, sessile and pedunculated, the nodular valves and the median outgrowths, adenomata, etc. From all these cases it was perfectly evident that no one operative procedure could possibly fit all cases, and that the operation should be selected according to the cases at hand, rather than the personal inclination of the operator. The conditions favorable for the several operations in vogue were summed up as follows: Favorable for the suprapubic route: (1) General enlargement of the prostate, with extreme intravesical projection of the median or lateral lobes, diminishing their accessibility from the perineum; (2) marked pedunculation of the intravesical tumors, with absence of obstruction from other sources. Favorable for the perineal route: (1) General hypertrophy, involving the lateral lobes, without extreme intravesical projection; (2) large or very thick bar formation; (3) severe compression of the urethra between massive lateral lobes; (4) excessive development of the prostate in the direction of the rectum; (5) in most cases when the patient is in good general condition, is not too aged, and there is not a special indication favoring one of the other procedures. Favorable for the Bottini: (1) Cases of extreme debility, or of extreme age, unable to stand one of the severer operations; (2) cases of bar or median sessile obstruction of not too great dimensions; (3) in complete collar formations; (4) Horwitz says it should be employed as a prophylactic against further obstructive tendency at the beginning of catheter-life.

Dr. F. L. Sturgis of New York said that the removal of the prostate and ejaculatory ducts prevented the flow of the prostatic secretion which was so essential to the vitality of the spermatozoa and therefore tended to render the male sterile. On this account he believed that some partial operation, like the Bottini, was preferable.

Dr. Eugene Fuller of New York said that if one had to deal with 100 cases of prostatic enlargement, 75 of them would offer something new. In cases in which there were troublesome hernias, if the bladders be opened and drainage instituted the tenesmus and straining cease and often the hernias disappear.

Dr. F. Tilden Brown of New York said the use of the cystoscope was unsatisfactory in determining just what one had to deal with. If there were any excuse for making a suprapubic opening he believed such an opening should be made use of for the introduction of the cystoscope with which one could look directly down upon the trouble and learn its real nature. Recently he had an opportunity to examine two cases through a suprapubic opening and he had learned a great deal that he never would have learned if the cystoscope had been introduced through the urethra.

Dr. H. H. Young of Baltimore considered the Bottini operation one of great value. He had had nineteen cases over seventy years old, three over eighty years old, without a single death following the Bottini operation, and in all but two good results followed. Thirteen of these used the catheter and all but two were able to discard it.

Dr. William T. Belfield of Chicago said that nothing was known regarding the etiology of this condition. Some of the most violent cases of prostatism occur in those who have no prostates at all. He thought the importance of enlargement of the prostate as a cause of the trouble was overestimated.

Note Upon the Detection of Stone in the Kidney by Skiagraph, with Specimen.—Dr. James Bell of Montreal showed photographs of a case in which the skiagraph had demonstrated a stone with perfect satisfaction. At the time of operation it was shown to be in the situation and to be of the size shown in the skiagraph.

SECOND DAY—APRIL 30TH.

The morning session was devoted to a general discussion of the Surgical Treatment of Genito-Urinary Tuberculosis.

Renal Tuberculosis.—Dr. F. Tilden Brown of New York said that at the Presbyterian Hospital during the last ten years there had been 1,427 necropsies, of which number 258 (18 per cent.) showed tuberculous lesions somewhere in the body and 48 of them (18.5 per cent.) showed renal tuberculosis. Of the latter number 32 occurred in males and 16 in females; tuberculous lesions existed in both kidneys in 39, while but one kidney was affected in 9, 5 of these involving the right and 4 the left kidney. Of the 258 tuberculous bodies it was shown that the kidneys were more commonly involved than the spleen, liver or adrenals. During the same time there were in the hospital 78 cases diagnosed as renal tuberculosis, of which number 13 (16 per cent.) had nephrectomy performed, with but one death occurring two months after the operation; at the autopsy the other kidney was found to be involved. The vast majority of cases that come to autopsy which show tuberculous lesions in the kidney were of the disseminated miliary type and with such a class of patient, of course, surgeons have not to deal. At necropsies as high as three or four per cent. of healed cases of pulmonary tuberculosis have been found; whereas it was of the rarest occurrence to find at autopsy any evidence of Nature's efforts to attempt to cure renal tuberculosis. From a surgical standpoint he did not believe any surgeon would hesitate to perform an immediate nephrec-

tomy if he was sure that one kidney contained the only appreciable focus of the tuberculosis. Through the courtesy of his colleague, Dr. Tuttle, he was able to show a picture of a case of pseudotuberculosis of the kidney, a very rare condition, first described in 1891.

Tuberculosis of the Seminal Tract.—Dr. Hugh H. Young of Baltimore presented an exhaustive résumé of the literature bearing upon the question of pathology and treatment; his conclusions were as follows: The disease may begin primarily anywhere in the tract, but usually it starts in the epididymis. The bacilli which are being constantly carried up with the testicular secretion along the vas deferens very soon localize in the ampulla of the vas, the ejaculatory duct, the seminal vesicle, and the adjacent portion of the prostate. The testicle is very seldom the point of primary origin, and it becomes involved secondarily generally much later than the seminal vesicles, though it seemed not to be so immune as formerly supposed. Tuberculosis frequently travels from the kidney to the prostate and from there involves the testicle, but it is almost never primary in the bladder. There are to be found in literature 35 cases in which the seminal vesicles have been removed for tuberculosis; of these 14 will not be considered because the operator failed to state ultimate results. Of the 21 which were followed, 6 died, 5 had recurrences, and 10 were classed as well. Only 8 cases were followed over one year and of these 2 died, 2 had perineal fistulæ, and 4 were classed as cured. In only one of the 6 fatal cases was pulmonary involvement present before operation. Considering, then, that both seminal vesicles were involved in but 12 cases, the infrequency of lung and bladder tuberculosis, these 35 cases were not the most intensive, and, with cures claimed in less than 50 per cent. and with only 8 followed more than one year, the results obtained by operative removal of the tuberculous seminal vesicles were indeed unsatisfactory, and apparently not nearly so good as when a partial operation upon the external disease in the testicle alone is attempted.

Tuberculosis of the Testicle.—Dr. Paul Thorndike of Boston presented a short paper on this topic based upon 75 cases of the disease, collected from the wards of the Boston City Hospital. Sixty-seven per cent. of these cases occurred between the ages of twenty and forty years. Sixty per cent. involved the left testicle. Eighteen per cent. involved both testes. Thirty-six per cent. involved the right testis. Gonorrhea had preceded the development of the disease in 30 per cent. of the cases, and trauma in 12 per cent. The epididymis alone was involved in 42 cases. The epididymis and testis were involved in 32 cases. The vas deferens was palpably involved in 12 cases; the seminal vesicles in 16; the prostate in 13 cases. His paper discussed two points, first, the feasibility of removing the epididymis and leaving the testis behind in proper cases; second, the benefit to the patients of operations which remove only a part of the disease in cases in which total eradication of the tuberculous process is impossible.

Genito-Urinary Tuberculosis.—Dr. Paul Thorndike of Boston presented two cases. In the first the deposit in the prostate was shown not alone the only manifestation of tuberculosis in the urogenital system, but also the only one in the body. In the second case, in a patient with Addison's disease, it was clearly shown that the ureter on the same side as the diseased adrenal had been infected through its mucous lining by the tubercle bacillus carried there presumably by the urine secreted by the kidney, the adrenal of which was tuberculous.

An Analysis of 96 Operations for the Relief of Tuberculosis of the Testicle.—Dr. Orville Horwitz of Philadelphia presented the following conclusions to his paper: (1) A primary tuberculous infection of either the epididymis or testicle may occur, the former being by far the more common. (2) A primary infection of the epididymis, secondarily that of the testicle is more common than the descending one. (3) Primary involvement of either the epididymis, or testicle, usually takes place through the circulation; the soil being predisposed to the location of the tubercle bacillus either by a slight traumatism or by some infecting condition which has given rise to inflammation of the organ—most commonly an attack of gonorrhea. (4) Secondary tuberculous involvement of the epididymis or testicle sometimes follows a primary focus of the disease in other portions of the body; more commonly in those organs that are in a direct anatomical connection with the sexual glands, such as the seminal vesicles, the prostate, urethra, bladder, ureter, or kidney. (5) The invasion of the testicle may be rapid, associated with acute inflammatory symptoms, an abscess soon developing; or the onset may be slow, the symptoms simulating those of chronic syphilitic orchitis or of malignant disease of the organ. (6) The tuberculin test should always be employed in doubtful cases in which only one focus of the disease is known to exist. (7) In doubtful cases associated with hydrocele, the fluid should be examined for the tubercle bacilli and inoculating experiments made. (8) The injections of either emulsions of iodoform or of sulphate of zinc into the diseased part are not to be recommended. (9) In all cases of encapsulated caseous nodules quiescent in the epididymis, epididymectomy should be performed. (10) Epididymectomy together with resection of the vas deferens is not attended by either atrophy of the testicle or sexual weakness. (11) The drainage of tuberculous abscesses followed by the use of the curette is only to be employed when radical treatment is not permissible, as it is attended by more or less danger and is generally unsatisfactory in its results. (12) In instances in which the epididymis alone is involved, a resection of the diseased structure is all that is required; whether a partial or complete resection of the vas deferens is to be undertaken or is still undecided. (13) Double orchectomy should be performed when both glands are diseased, provided there is not extensive coexisting tuberculous infection of other organs. (14) Whether infected seminal vesicles should always be removed at the time that the epididymis or testicle is resected is a question open for discussion. From the fact that in a large majority of cases the removal of the primary seat of the disease is followed by a subsidence of the tuberculous involvement of the vesicles, it is deemed wiser as a rule to wait and remove the vesicles later if necessary. (15) Hygienic and climatic influence play important parts after operation in fortifying the constitution against further invasion as they do in other tuberculous conditions. (16) The antituberculous remedies are of great value in controlling the disease and should be employed in conjunction with whatever surgical procedure may be deemed necessary.

Teratoma of the Testicle; Report of Case; Presentation of Photographs.—Dr. James R. Hayden of New York reported the case of a patient who, seven years previously, had had an epididymitis complicating a second attack of gonorrhea; since then the right testicle had remained a little large. Two and a half months before admission to hospital it began to increase in size, became firm and hard and during the past few weeks had become quite painful, with a feeling of weakness when standing, but which disappeared when walking. Examination showed the right half of the scrotum occupied by a smooth, painless, heavy elastic tumor, the circumference of which was eleven and three-quarter inches. The scrotum was normal in appearance and

non-adherent. The tumor was removed and the pathologist reported that sections of it showed that it was mostly composed of sarcomatous and carcinomatous elements and undoubtedly belonged to the class of teratomata. The sarcomatous tissue was both small round-celled and small spindle-celled, with a few giant cells. The cancer was adenocarcinoma and practically replaced all the glandular elements. A considerable cartilaginous element of the hyaline variety was present, with here and there a beginning ossification. The tumor taken as a whole on account of its composition and the large proportion of cells over basement and intercellular substance should be regarded as decidedly malignant.

Gangrene of Penis; Report of a Case, with Presentation of Photographs.—Dr. James R. Hayden of New York reported the case of a patient, fifty-seven years old, married, a printer by occupation, who was admitted to Bellevue Hospital, January 15, 1902. He denied ever having had any form of venereal disease, local traumatism, or cauterization. He was a paranoiac, having various delusions as to the cause and nature of his present trouble, the rather unsatisfactory history of which was as follows: About two weeks prior to admission he noticed a small black spot on the end of the glans penis which increased in size and gradually spread over the rest of the organ, giving rise to an offensive odor. Aside from the mental condition, the patient appeared to be a healthy man in all respects. The entire penis from the meatus to within one inch of the abdominal wall was greenish-black in color, dry, hard and gangrenous, with a most offensive and penetrating odor. The line of demarcation was very distinct. The urine was passed from the under surface and about the middle of the penis. The inguinal glands were not involved. The parts were frequently irrigated and dressed with hot bichloride solution, as a result of which the slough was removed in a few days, leaving a raw and bleeding stump about one and a half inches in length, from the end of which, at the lower border, the urine was passed in a good stream. Healthy granulations were established and the entire stump was covered with skin grafts which was followed by a favorable outcome, with the corpus cavernosa completely covered with sound integument. The patient left the hospital six weeks after his admission.

Officers for the Ensuing Year.—President, Dr. Paul Thorndike, Boston, Mass.; Vice-President, Dr. Edwin C. Burnett, St. Louis, Mo.; Secretary, Dr. John Vanderpoel, New York; Council, Dr. William T. Belfield, Chicago, and Dr. James R. Hayden, New York. Next place of meeting, Washington, D.C.

NEW YORK NEUROLOGICAL SOCIETY.

Stated Meeting, Held April 8, 1902.

The President, Joseph Collins, M.D., in the Chair.

A Case of Asthenic Bulbar Paralysis.—Dr. George W. Jacoby presented a young woman with asthenic bulbar paralysis. He said that this was only the second case that he had seen. The other case was that of a young man who now presented an interval that had lasted for three years. From the histories of other reported cases it was not probable that the man had permanently recovered. The patient presented was a girl of twenty years, who had been perfectly well until last May, when while reading aloud her voice was noticed to falter. Within a few weeks this became quite noticeable even on speaking. About this time there was some double vision. Later on there were nasal speech and regurgitation of fluids through the nose. Only within the last two months had she developed a slight weakness of the right hand. He called attention to the broadness of the mouth, the thickness of the lips, the almost expressionless appearance of the face and the difficulty of pointing the mouth as in the act of whistling. There is inability to completely close the eyes, and the reflexes are exhaustible.

An Experimental Study of the Reflexes in Total Transverse Lesions of the Spinal Cord.—Dr. William Aldren Turner of London presented a paper on this subject, considering more especially the knee-jerks. He said that the reflex phenomena varied considerably, depending upon whether they were studied experimentally or clinically. After commenting briefly on the literature, the author said that a weakening or temporary abolition of the knee-jerks was more commonly noted after high than after low transections, but in no instance was complete absence observed. The influence of shock in laboratory transections seemed to be particularly small, and when present its effects were limited almost entirely to the distal parts, and there was little difference in the severity of the shock whether the transection was in the lower thoracic or in the cervical region. Sherrington was quoted as saying that in the monkey spinal transection usually depresses the knee-jerk for a longer time than in the cat or dog, and that spinal transection above the lumbar enlargement renders the jerk more brisk than normal after a short period of depression. Dr. Turner said that many years ago when working with Dr. Ferrier on the experimental lesions of the cerebellum, it had been noticed in a case in which the section had been made at the eighth dorsal segment by means of a knife, that the knee-jerks were brisk and increasing immediately afterward, and that they lasted for four months. The speaker then described some recent experiments made by him on monkeys. A transection was made upon a rhœsus monkey at the level of the fourth dorsal nerve, and the knee-jerks were found to be brisk. A crossed adductor jerk was also present. The animal lived for five days. In another monkey of the same species the section was made at the level of the fourth dorsal segment, a hemisection having been first made and the reflexes tested, and then the animal reanesthetized and the section completed. In this case the knee-jerks were brisk and there was also a crossed adductor jerk. The animal lived two days. Another rhœsus monkey was then subjected to section by the knife at the level of the first dorsal nerve. In this experiment the knee-jerks were not obtained after the first quarter of an hour. There was a crossed adductor jerk on both sides and a superficial anal reflex. The animal died three days later. In another rhœsus monkey the section was made by ligature at the level of the ninth dorsal nerve. After a preliminary depression the knee-jerks were brisk, and the crossed adductor jerk and the superficial anal reflex were present. The animal lived for four days. By contrasting these two experiments it seemed as though the method of section was of some importance, influencing, at least temporarily, the knee-jerks. These experiments certainly showed that the effect on the knee-jerks was influenced by the level at which the section was made. As soon as the monkeys emerge out of the anesthetic, if the section had been made at or below the fourth dorsal segment, the knee-jerks were present, and might be even more lively than before. Patulousness of the anus was rare. The limbs were in a state of flaccid palsy. In time, rigidity and contracture occurred. In the transection at the level of the second or third dorsal segment some difficulty was experienced temporarily in eliciting the jerks, and they seemed to be quickly exhausted. Transection at the level of the first dorsal and the eighth cervical segments resulted in the knee-jerks being temporarily

obtained with difficulty, and they entirely failed after fifteen to thirty minutes.

Flaccid Paralysis.—Various theories had been advanced to explain flaccid paralysis with loss of the knee-jerks in man. The most commonly accepted explanation was the Bastian-Jackson theory, which ascribes the loss of the reflexes to the cutting off of the cerebral influences. In no case in which the cord had been completely severed had any return of the reflexes been observed. This explanation implied that the removal of the cerebellum should produce hypotonus and consequent loss or impairment of the knee-jerks, yet atonia had been declared by one observer to be a result of removal of the cerebellum. All observers agreed that even in those animals in which the knee-jerks are temporarily abolished their reappearance was a question of time, yet in monkeys even a temporary loss was not always observed. Instances of partial translesion with loss of the knee-jerks had been reported by several observers. Dr. Turner reported a case in which dislocation of the fifth cervical vertebra resulted in a complete flaccid paralysis and loss of the knee-jerks. The woman died 68 days later, and the postmortem examination showed that there was not a complete transection but that a thin ribbon or bridge, about 1 mm. thick, persisted. This band was shown by microscopical examination to consist of degenerated white fibers. In another case there was a fracture dislocation of the eighth dorsal vertebra, and the postmortem examination, sixteen months after the injury, showed a depression of the cord, the latter having been converted into a mere ribbon. In this case the reflexes persisted for four months. The plantar reflex was present in transections above the lumbar enlargement in man. From the experiments that he had made it was found that the crossed adductor and the superficial anal or perineal reflex, like the plantar, were not abolished by transection of the spinal cord. The condition of the knee-jerks in transection of the cord in monkeys was not constant. No such difference had been found in transections of the human spinal cord. Temporary abolition of the knee-jerks sometimes followed for a long period incomplete transections. In man, as experimentally in monkeys, though the knee-jerks might be abolished, the plantar and the superficial anal reflexes might be maintained. The speaker concluded that in spinal transection in man and in high transections in monkeys, actions dependent upon neuromuscular tone were temporarily or permanently abolished, but that true reflex movements were not impaired. The variation existing in the phenomena following spinal transection in monkeys would preclude the general application of Bastian's theory, for there was nothing on record to negative the view that the mechanism producing loss of knee-jerks in man, or their temporary abolition in man, was not to be found in the spinal cord itself.

Knee-Jerks in Man.—Dr. G. L. Walton of Boston said that the present tendency in favor of cerebral reflex centers was largely due to Bastian's observations, but the reflex conditions found in disease were too varied to be explained by the acceptance of centers either cerebral or spinal. The lower centers in the healthy human adult might remain, he thought, quiescent while the control of the higher centers might be interrupted by disease. An analogous condition was found in the vasomotor control. If the connection between the brain and the lumbar cord were primarily severed the knee-jerk would not return, but the plantar reflex might do so; if the destruction of the upper cord were gradual, the knee-jerk would not disappear; if the pyramidal transmission were reëstablished the knee-jerk would return. In early infancy extensive reflex movements of the foot and toes are present, and the knee-jerk is very active, although it is difficult or impossible to elicit it in prematurely-born infants. A tap should be made very near the patella with a small percussion hammer. If it were true that the plantar reflex could appear when the cord was permanently and completely separated from the brain, one would have to admit the existence of centers not only in the cord but in the brain. The reflex movements of the toes in infancy were of spinal origin, but were subsequently controlled by the higher centers. If the knee-jerk were temporarily lost it was because the cerebral reflex center was rendered ineffective by injury or functional separation from the lumbar region. The spinal centers would then become active. The point of divergence of the knee-jerk from the plantar reflex appeared first in complete severance of the cord. The other point of divergence was in the newly-born, in whom the knee-jerk was faint or wanting, and the cutaneous reflex active. In order to elicit the knee-jerk a certain degree of muscular tonicity was essential. The permanent loss of the knee-jerk in cases of severance of the cord might be due to the inability of the spinal centers for tonicity to perform their function. In the prematurely-born the spinal centers might not be able to act until the cerebral centers controlled the tonicity. It was probable that the spinal centers preside over the tendon reflexes of early life, but are gradually overshadowed by cerebral control.

Total Injury of Cord.—Dr. Philip C. Knapp of Boston said that comparatively few of the writers upon the reflexes had dwelt upon one point, *i. e.*, the extreme difficulty of proving anatomically the fact that the cord is totally destroyed. In one of his own cases there was clinical proof of conduction through the cord, and sections were made with very great care in order to determine the condition of the softened portion of the cord. It was found extremely difficult to make out the presence of normal nerve fibers in the softened part, although undoubtedly there must have been some. This might explain some of the published cases which appeared to contradict the rule. A case had come under his observation in which on removing the fractured laminæ the cord was found absolutely divided and the ends free. In this case a year after the accident there was flaccid paraplegia with loss of the knee-jerk and retained plantar reflex. This occurred before attention had been called to the Babinski reflex. Bastian's theory of the influence of the cerebellum upon the reflex seemed to be weakened by the fact that so rarely was there any change in the reflex in cases of cerebellar disease. The explanation of loss of the knee-jerk from complete section of the cord seemed to him far from satisfactory. It was known that if the entrance of the sensory fibers in the posterior horns and the columns in the third and fourth lumbar segments were destroyed, and the corresponding cells and anterior roots were destroyed going to the quadriceps, the reflex was lost, but even assuming that the nerve impulse must take a loop up into the cord to the level of the cervical enlargement, or possibly higher, it was difficult to understand this by the experiments brought forward by Dr. Turner to-night. If there were a reflex arc or a mechanism for the neuromuscular tonus, why should it be destroyed by a lesion high up while a lesion below, which must cut off all communication allows of the preservation of the reflex?

Dr. Charles K. Mills of Philadelphia said that he did not feel that he could contribute anything new to this interesting subject, but he would mention the fact that he had had quite a number of cases, with autopsies, which tended to confirm the views expressed by Dr. Turner. He had had a number of autopsies on cases

of incomplete section of the spinal cord in various regions, in which the conditions were those already described this evening. He could recall several traumatic cases in which high lesions with complete loss of the knee-jerk had been present. His mind was far from being clear as yet with regard to the mechanism allowing of the retention of the knee-jerk under certain conditions and its loss under others. The cerebro-cerebellar theory had always seemed to him the most nearly satisfactory. He had had a comparatively large number of cases of cerebellar lesion, and these had shown interference with the knee-jerk, but the conditions had not been uniform. He had seen loss of the knee-jerk in cases afterward demonstrated to be examples of cerebellar disease. He had seen increased knee-jerk and even crossed knee-jerk in connection with cerebellar disease, and he was satisfied that disease of the cerebellum plays a part in interfering with the knee-jerk as with other reflex phenomena. The fact that lesions at the cervicodorsal junction when complete were apt to cause loss of the knee-jerk was of great interest. The existence of a ciliospinal center in a particular region of the cord might be suggestive with regard to the effect upon the knee-jerk and the lower reflexes in these particular cases.

Knee-Jerk not a True Reflex.—Dr. Joseph Fraenkel thought, with Dr. Mills, that the more this problem was studied the less seemed to be really known about it which would be of value at the bedside. The presence of a ciliospinal center high up in the cord might help in the explanation of these phenomena. A number of heterogeneous phenomena were considered in connection with the reflexes. The plantar reflex, which seemed to be the only permanent skin reflex, was representative of the skin reflexes just as much as the knee-jerk was characteristic of the tendon reflexes. This knee phenomenon was one of the expressions of the muscular qualities. A muscle possesses what is called irritability, and quite a complicated neural apparatus keeps up what is called muscular tonus. Whatever interfered with this influenced the tendon reflexes. In conjunction with the president of this Society he had had carried on for four years a clinical study of the reflexes, measuring at the same time the tonicity of the muscles. This study embraced about 600 cases, and included certain interesting pathological findings. They had become convinced that the knee-jerk was absolutely dependent upon the muscle tonus. If the muscle tonus were increased through pain in a joint there would be an increase of the knee-jerk. When the lesion of the spinal cord had been slowly progressive there would be nutritive shortening of the muscle, but the muscle tonus not being destroyed the reflex would still persist. The tendon reflexes should really be placed in the same category with the visceral reflexes. The considerable discrepancy between the findings at the bedside and in the laboratory had been explained by a recent publication of Strümpel, in which it was stated that the mechanism of the reflexes in the lower animals and in man was different.

Dr. Turner, in closing, said that until he had collected the results of his experiments in tabular form he had had no idea that the condition of the reflexes was so extremely variable. On referring to the literature he had found that this had been noted by several observers quite a number of years ago. He was in perfect accord with the position taken by Drs. Collins and Fraenkel. The condition of the knee-jerks was entirely due to the state of neuromuscular tonus, for, it was just this which was affected by transection. The superficial anal reflex was a pure one, and was found usually in monkeys and commonly in man. Unfortunately, the plantar reflex could not be elicited in monkeys. The effects on the reflexes observed in cases of disease of the cerebellum and in experimental lesion of the cerebellum were very different. He thought we should ascribe these variable phenomena not so much to the existence of a tumor in the cerebellum as to interference with intracranial pressure from the presence of a morbid growth under the tentorium cerebelli.

SOCIETY OF ALUMNI OF BELLEVUE HOSPITAL.

Stated Meeting, Held March 5, 1902.

The Vice-President, Robert T. Morris, M.D., in the Chair.

Dr. A. J. Lartigau read a paper on the Etiology of Gall-Stones, and Dr. Nathan E. Brill read one on the Differential Diagnosis of Gall-Bladder Disease. (See this week's MEDICAL NEWS.)

The Surgery of Gall-Stones.—Dr. Joseph A. Blake was the author of this paper. He said that earlier and more accurate diagnoses of gall-bladder disease should be made. An outline sketch was given of his last eleven cases of surgery of this region in order to show the nature of cases of this kind usually found in general hospitals. They included three cases of acute suppurative cholecystitis, three cases of chronic cholecystitis with stone in the common duct and fifty small calculi, one case of chronic cholecystitis and cholangeitis with stricture of the duodenum, and one case of rupture of the gall-bladder occurring one week prior to operation. The speaker said that mortality from gall-stone surgery must necessarily vary greatly depending upon the stage of the disease at the time of the operation and the complications present. It should not be high under favorable circumstances. Stones in the common duct were unfavorable cases, the mortality ranging from 6 to 20 per cent. with different operators. Biliary colic was generally due to cholecystitis and operation should be undertaken as soon as the diagnosis of cholecystitis was made. The status of gall-stone surgery to-day resembled that of appendicitis surgery ten years ago. There was now undue delay in operating on gall-stone cases. Cholecystectomy first came into favor in France, but was being more frequently performed now by the German and American surgeons. It was indicated as the operation of choice (1) in gangrene of the gall-bladder with suppurative inflammation endangering its vitality; (2) in neoplasms of the gall-bladder; (3) in cases of injury of the gall-bladder, and (4) in cases of permanent obstruction of the cystic duct. It should not be performed in cases in which drainage was indicated, in other words, when there was uncertainty as to the patency of the common duct, in cholangitis, when the duct is sutured after choledochotomy and the gall-bladder can be easily and safely drained. There was a class of cases, for the most part "interval" cases, in which cholecystectomy seemed to him the preferable operation. Pain was apt to recur in cholecystotomy; a biliary fistula was present, and the stasis of the bile in the gall-bladder was known to be a potent factor in the etiology of cholelithiasis. On the other hand, according to statistics, there was a greater mortality in cases of cholecystectomy. If the gall-bladder had no important function to perform he thought it should be removed in appropriate (For full report see this week's MEDICAL NEWS.)

Empyema of the Gall-Bladder.—Dr. Lucius W. Hotchkiss read this paper. He defined empyema of the gall-bladder as that form of infectious cholecystitis, acute or chronic, characterized by the presence of pus in the cavity and by various changes in the walls and the peritoneal covering of the organ. The different degrees of inflammation showed themselves most clearly in the condition of the mucosa of the gall-bladder. When the cystic duct was obstructed the gall-bladder

became a cyst with serous or purulent contents. The inflammation generally extends to the walls of the gall-bladder causing marked thickening and edema of the serous and muscular layers, and leads to the formation of adhesions to the omentum and neighboring viscera. Local peritonitis frequently develops by the passage of infection through the intact gall-bladder. The degree of inflammation depends upon the virulence and character of the infection. In most cases of purulent cholecystitis the infection was derived from the intestine by way of the bile-duct, but in some instances the infection came directly from the blood-stream. The colon bacilli usually succumb quickly and the cholecystitis set up by this organism was not usually virulent unless reinforced by other bacilli. Up to a certain point attacks of cholecystitis were to be looked upon as conservative and sometimes were even curative by causing the expulsion of the stone. Kehr made the following clinical classification: (1) Acute cholecystitis in the relatively healthy gall-bladder; (2) acute cholecystitis in a contracted gall-bladder which has been frequently the seat of inflammation; (3) empyema of the gall-bladder; (4) stone in the cystic duct, and (5) pus in the bladder cavity and adhesions. In the first group there was generally a tender and palpable tumor in the region of the gall-bladder and fever was usually present. (For full report see this week's MEDICAL NEWS.)

Dr. William J. Chandler of South Orange said that he had met with distention of the gall-bladder with air in a patient who had been brought to hospital suffering from acute and advanced intestinal obstruction. It was necessary to make an artificial anus, and during this operation the condition of the gall-bladder was noted.

Dr. H. H. Seabrook said that there was very little in literature regarding the effect of cholemia on the eye. He recalled the fact that he had published in 1895 a paper on this subject, and added that he did not think any articles had appeared since that time. The changes in the retina were not very different from those observed in diabetes and in Bright's disease. The different forms of liver disease all presented these retinal changes, and they so closely resembled those found in Bright's disease that they were not of any diagnostic value.

Dr. C. E. Quimby said that a great many of these patients could not be prevailed upon to submit to operation as early as cases of appendicitis. Those affected with the latter disease were told that the operation entailed little or no risk, but the same assurance could not yet be given to patients suffering from gall-bladder disease. He had yet to see an explanation of why the "oil treatment" does any good in cholelithiasis. He had been taught that oil was a stimulant of the liver and had begun to use it as a physiological stimulant to the function of that organ. The use of oil certainly seemed to relieve these cases very decidedly. It was not the oil directly which did any good, hence it should not be given in heroic doses, but in ordinary ones. By such medication the flow of bile was augmented, and probably also a secretion was developed which contained a relatively small proportion of the solid elements. A bile of this character might possibly be capable of absorbing or dissolving cholesterin. He was absolutely sure that nothing was superior to this use of oil as a stimulant to the liver.

Dr. Robert Wylie referred to a recent case in which, owing to the very great enlargement of the liver, a very deep cavity was formed. He had found it very difficult to operate satisfactorily in this cavity, and he would like to know what Dr. Blake does in cases of this kind.

Dr. John F. Erdmann asked Dr. Brill with reference to infective jaundice due particularly to the bacillus pyocyaneus. In a recent case there had been evidence of choledochus obstruction, and at the operation no gall-bladder was found. Immediately after the operation an intense odor developed, such as occurs in connection with the bacillus pyocyaneus, and a few days later this bacillus was present. He would like to know if there had been an infective jaundice of this kind prior to operation, or if the infection had occurred at the time of the operation. He had not met with this bacillus for some months previously.

Dr. Robert T. Morris said that he would like to know why gall-stones occur more frequently in the aged if due to bacterial infection. Was this because of a lessened cell resistance? Most cases of colon bacillus infection of the appendix occurred in young people, which seemed to negative the view that it was a question of cell resistance, except on the theory that the appendix had largely undergone involution after middle life. The speaker referred to a recent case in which there was a large mass in the vicinity of the gall-bladder which fluctuated and moved with respiration. The patient had had attacks of gall-stone colic. At the operation a cancer of the head of the pancreas was found. It was filled with fluid and brown débris, thus explaining the fluctuation. It was retroperitoneal, but had a range of motion similar to the gall-bladder. It had undoubtedly caused attacks of biliary colic by pressure on the common duct. In determining with the stethoscope whether gall-stones were present, it was well to oil the skin, thus eliminating the crepitation produced by friction of the instrument against the skin. Infection of the gall-bladder by way of the portal system from the appendix no doubt occurred occasionally, but in many cases of this kind there was undoubtedly pressure on the superior mesenteric vein, and this would give rise to congestion of the cecum and appendix, thus explaining the simultaneous occurrence of these two conditions. He would like to know if Dr. Blake had noticed in one of his cases if the cholesterin of the stone had been attacked by the pancreatic juice, which sometimes takes place, owing to the proximity of the pancreatic duct.

Dr. A. J. Lartigau said that old people were more subject to disease of the liver, and such disorders would naturally predispose to infection. Moreover, as age advances the bile showed a tendency to become thicker and constipation was apt to be present, a condition which greatly favored the passage of micro-organisms into the portal circulation. His experience with pyocyaneus infections of the liver had been limited to the newborn, and most of the cases had originated from the gastro-intestinal tract. No special lesions of the liver had been noted in these cases. In a recent article on experimental physiology the statement was made that neither calomel nor olive oil actually stimulate the flow of bile. In the gall-bladders that he had studied he had been able to find the original micro-organism as long as two years after the inoculation.

Dr. Brill said that two years ago Dr. E. Libman and he had reported a case of systemic infection with the bacillus pyocyaneus. He thought such infections were rather common secondary to pyogenic infections.

Dr. Blake said that enlargement of the gall-bladder could occur in cases of obstruction of the common duct by stone if there had not been marked prior inflammation. He was unable to state what were the ultimate results of removal of the gall-bladder, except that no bad effect had been noted in the cases so far reported. In the class of cases spoken of by Dr. Wylie it was probably best to drain the liver through the gall-bladder. The stone presented by him had been situated nearly at the junction of the hepatic and cystic ducts, and at least one inch and a half from the duodenum. In that position it could hardly have been perceptibly influenced by the pancreatic juice.